NOVEMBER
1961
ONE DOLLAR
A McGRAW-HILL
PUBLICATION

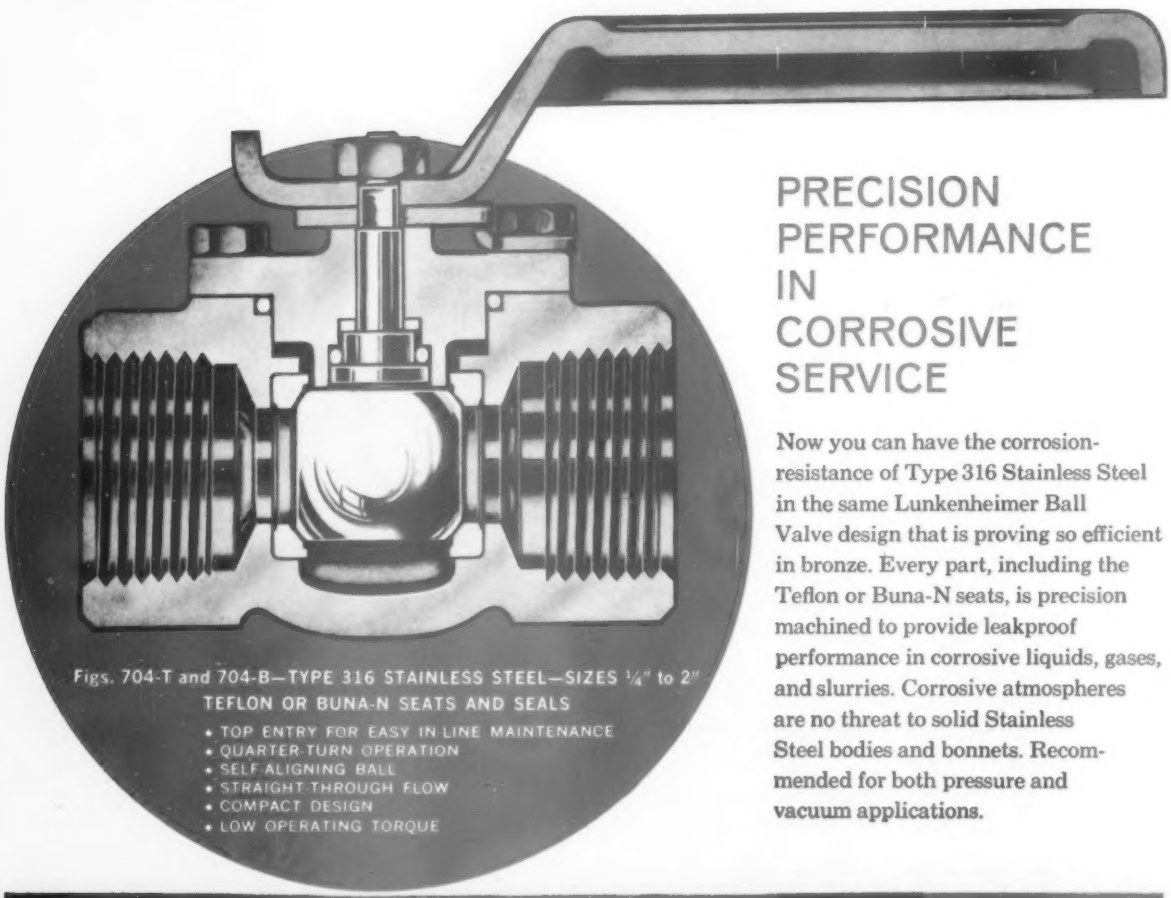
FOR BETTER MANAGEMENT OF PLANT OPERATIONS

THE ATTACK ON INDIRECT COSTS

Housekeeping
Employee services
Maintenance
Material handling
Paperwork
Plant protection
Quality control
Staff services
Tools and supplies
Utilities

1. Where they hurt you most now
2. How hard they will strike next year
3. How to check your plant for soft spots
4. Action you can take to curb these costs
5. What other companies are doing about them

NEW LUNKENHEIMER STAINLESS STEEL BALL VALVE



Figs. 704-T and 704-B—TYPE 316 STAINLESS STEEL—SIZES ¼" to 2"
TEFLON OR BUNA-N SEATS AND SEALS

- TOP ENTRY FOR EASY IN-LINE MAINTENANCE
- QUARTER-TURN OPERATION
- SELF-ALIGNING BALL
- STRAIGHT-THROUGH FLOW
- COMPACT DESIGN
- LOW OPERATING TORQUE

PRECISION PERFORMANCE IN CORROSIVE SERVICE

Now you can have the corrosion-resistance of Type 316 Stainless Steel in the same Lunkenheimer Ball Valve design that is proving so efficient in bronze. Every part, including the Teflon or Buna-N seats, is precision machined to provide leakproof performance in corrosive liquids, gases, and slurries. Corrosive atmospheres are no threat to solid Stainless Steel bodies and bonnets. Recommended for both pressure and vacuum applications.

LUNKENHEIMER®

THE ONE *Great* NAME IN VALVES

• BRONZE • IRON • STEEL • PVC

LUNKENHEIMER L QUALITY

Get Circular 612 from your distributor or The Lunkenheimer Co., Cincinnati 14, Ohio.

1 561 24

For more facts circle 404 on **READER SERVICE CARD**

B.F.Goodrich

V belt briefs

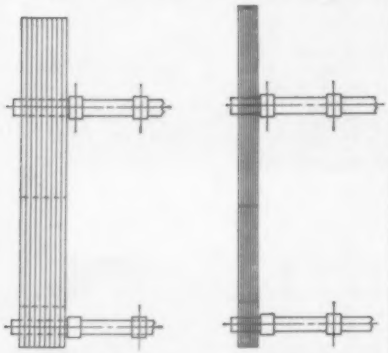
TIPS ON THE CARE, MAINTENANCE AND SELECTION OF V BELTS FOR INDUSTRY

ORDINARY V BELT DRIVE

MAXIPOWER DRIVE

SAVE $402.14 ON V BELT DRIVES—*Costs for* both *sheaves and V belts were cut when B.F. Goodrich Maxipower belts replaced ordinary belts on this drive. Size and weight of sheaves were reduced, smaller and fewer V belts were used*—eight *5V2500 belts replaced* nine *D-240 belts. The result: a $402.14 saving. Costs can be cut as much as 30% by switching to a Maxipower V belt drive.*

How Maxipower V belts reduced bearing load 42%



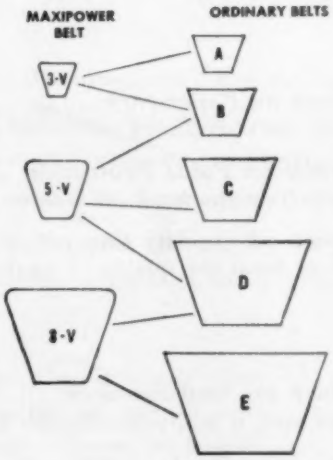
ORDINARY DRIVE

MAXIPOWER DRIVE

In the installation shown above, sheaves for the Maxipower drive are lighter, have a face width of only $5\frac{13}{16}$", compared to a $13\frac{1}{4}$" width for the sheaves on the ordinary drive. Because there's less weight, less shaft overhang, bearing load for this Maxipower drive is 42% less for the driven shaft shown than the drive replaced. This greatly increases bearing life.

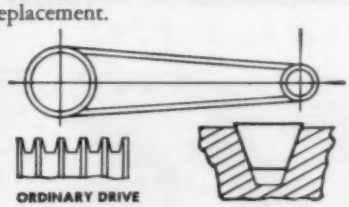
With Maxipower V belts, three cross sections do the work of five

Each cross section of the new B.F. Goodrich Maxipower V belts has been fitted to a particular horsepower range so that only three cross sections are needed instead of the A, B, C, D, and E sections of conventional V belts. The three cross sections are 3V, 5V and 8V.

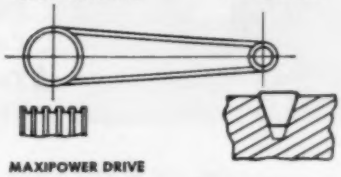


New BFG Maxipower V belts save space, weight, bearings, dollars

New B.F.Goodrich Maxipower V belts give up to three times the horsepower-carrying capacity in the same amount of space as ordinary belts. This more compact drive gives you more horsepower per dollar, results in substantial savings, both in initial costs and often in belt replacement.



ORDINARY DRIVE



MAXIPOWER DRIVE

In most Maxipower installations, fewer belts and smaller diameter sheaves are used, center distances are shorter. Costs can be cut up to 30%, valuable space is saved. Sheaves have narrower grooves and groove spacing, are smaller, less costly. The smallest sheaves that can safely be used with the drive motor can be installed. Often these will be 50% smaller than present drives. This reduced sheave weight and face width means less shaft overhang, less bearing load—increased bearing life.

The extra strength of Maxipower V belts comes from its new rubber compounds, the tough fibers used in its load-carrying cords, and the new "deep V" design. Because of this design the belt's load-carrying cords are supported so completely that each has an equal share in the load—none "loaf".

All Maxipower V belts are heat-resisting, oil-resisting at no extra cost. Belts with static conducting properties can also be ordered *at no extra cost.*

For further information and help in selecting Maxipower belts for your drives, call your B.F.Goodrich distributor. *B.F.Goodrich Industrial Products Company, Dept. M-114, Akron 18, Ohio.*

B.F.Goodrich V belts

FOR BETTER
• PLANT MAINTENANCE & ENGINEERING
• PRODUCTION
• PLANT MANAGEMENT

NOVEMBER 1961

FACTORY

PUBLISHER
Donald H. White

EDITOR-IN-CHIEF
Lester R. Bittel

MANAGING EDITOR
Robert S. Rice

SENIOR EDITOR
Carl G. Wyder—Plant Maintenance and Engineering

ASSOCIATE EDITORS
Gerald C. Quinn—Electrical
Gregory V. Schultz—Production
Herbert F. Lund—Buildings
Roger W. Christian
Lawrence F. Mihlon
Richard L. Grant
Norman H. Solon

COPY EDITOR
Joan C. Hopkins

SPECIAL REPORT

The attack on Indirect Costs 82
Industry's ripe new target for slashing expenditures

Trends in Indirect Costs 84
Wherever you work, these costs are on the rise

The 10 critical areas in Indirect Costs 86
Pinning down the potential savings

The attack on Housekeeping 92
The high cost of dirt and disorder

The attack on Employee Services 98
Get 100 cents worth from your benefit dollar

The attack on Maintenance 104
A wealth of latent, but sure savings

The attack on Material Handling 110
An ounce of ingenuity is worth a pound of automation

The attack on Paperwork 116
The stack that's screaming for attention

The attack on Plant Protection 122
Ease away from the brink of disaster

The attack on Quality Control 128
It's time to boost the quality of quality control

The attack on Staff Services 134
The right staff is indispensable; the wrong one impossible

The attack on Tools and Supplies 140
Small items with a voracious money appetite

The attack on Utilities 146
There's more to it than closing some valves

ASSISTANT EDITORS
Vivian E. Lunardi—Departments
Gladys Owen—Departments
Timothy W. Hubbard

ART DEPARTMENT
Carl Cerminaro, Director
Richard A. Moss

READER SERVICE
Rosemarie La Vecchia

CONSULTING EDITORS
L. C. Morrow
Lewis K. Urquhart

WORLD NEWS BUREAUS
John Wilhelm, Director
Margaret Ralston, Assistant Manager

DOMESTIC NEWS BUREAUS
Washington:
George B. Bryant, Director
Alan E. Adams, Labor Trends
Harry Van Dernoot, Washington Wire
Atlanta: B. E. Barnes
Chicago: Stewart W. Ramsey, Bruce Cross
Cleveland: Arthur Zimmerman
Detroit: Donald MacDonald
Dallas: Marvin Reid
San Francisco: Jenness Keene
Los Angeles: Kemp Anderson
Seattle: Ray Bloomberg

FOREIGN NEWS BUREAUS
London, Paris, Bonn, Moscow
Mexico City, Tokyo,
Milan, Rio de Janeiro

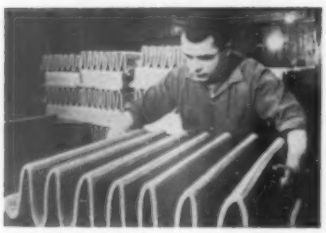
McGRAW-HILL DEPARTMENT OF ECONOMICS
Douglas Greenwald, Manager of Economic Services
William J. Brown, Cost Index, Business Trends

ADVERTISING AND BUSINESS DEPARTMENT
H. R. Mathias, Advertising Sales Manager
Charles E. Walsh, Promotion & Research Manager
William J. Thierer, Business Manager

CIRCULATION DEPARTMENT
Bain Brown, Manager

DISTRICT MANAGERS
L. E. Crist, Boston
J. G. Sabella, D. B. Waite, 500 5th Ave., N. Y. 36
L. L. Graves, Philadelphia
R. A. Dilley, Pittsburgh
W. H. Ware, Cleveland
T. W. Van Winkle, Detroit
B. M. Kewin, A. B. Martin, R. P. Rose, Chicago
B. M. Kewin, St. Louis
R. L. Yocom, Los Angeles
J. H. Hernan, San Francisco
M. H. Miller, Atlanta
John Grant, Dallas
D. O. Hanson, Houston
J. W. Patten, Denver
E. E. Schirmer, Malcolm Thiele, London; M. R. Zeynel, Geneva; Stanley Kimes, Frankfurt

NEWS



PRESS TIME REPORT: Looking ahead in business, Washington wire, Cost index of plant maintenance, and Looking ahead in labor ..... *after* 74
EDITORIAL: Fifty years of better management 81
EQUIPMENT NEWS: "Twisted" lamps, two-way radio, dozens of others 156
CATALOG NEWS: Packing hose, meters, computers, many more 233
LABOR RELATIONS CLINIC: Labor expert answers your questions 256
MATERIALS NEWS: Foam air filters, movable walls, fuel supplements 270

DEPARTMENTS

PROBLEM-SOLVING GUIDE: Handy index of the help in this issue 4
LETTERS: Readers' reactions to topics of the day 6
ON STRIKE: Workers find pitfalls in forming own union 14
IDEAS: Oil-fired heaters, safety hats, snow melter 214
HUMAN RELATIONS: White-collar worker—key man in a power struggle 222
BOOKS: Our reviewer passes judgment on value analysis 280
FILMS: Flicks on numerical control, steel strapping, arc welding 286
ADVERTISERS' LITERATURE: It's yours for the asking 290

COMING

In December, you'll find the 14th of FACTORY's exclusive Engineering and Technology Reports—this one on the subject of leak detection. Also, there's a study of a new maintenance index; one that allows you to compare costs and predict needs for any plant facility, regardless of how near to (or far from) capacity it is running. **In coming months,** there will be a round-up of manufacturing tools and techniques just out of the laboratories.

COVER

Months ago, a dozen FACTORY editors got this assignment: Find out where indirect costs are hidden; pry loose the juiciest money-saving methods; search out plants that have eased their crushing overhead. This issue is their report.

FACTORY **70TH YEAR OF PUBLICATION**
November 1961 **Vol. 119 No. 11**
Published monthly by McGraw-Hill Publishing Company, Inc.
U. S. subscription rate for individuals in the field of publication: $2 per year; single copies: $1. Canadian and foreign rates on request.
Executive, Editorial, Circulation, and Advertising Offices: McGraw-Hill Building, 330 West 42nd St., New York 36, N. Y. printed in Albany, N. Y.; second-class mail postage paid at Albany, N. Y., and at additional mailing offices.
Postmaster: Please send Form 3579 to Fulfillment Manager, FACTORY, 330 West 42nd Street, New York 36, N. Y.

Turn the page for FACTORY'S Problem-Solving Guide

Ideas to cut 'n' keep

1.0–1.4 Plant maintenance and engineering

MANAGEMENT AND PRACTICES (1.1)

1.102 Maintenance and indirect costs (Nov. '61) p. 104
Checklist
Cost-cutting ideas
Case histories

BUILDINGS AND YARDS (1.2)

1.204 Housekeeping and indirect costs (Nov. '61) p. 92
Checklist
Cost-cutting ideas
Case histories

1.210 Plant security and indirect costs (Nov. '61) p. 122
Checklist
Cost-cutting ideas
Case histories

SERVICES AND FACILITIES (1.3)

1.308 Utilities and indirect costs (Nov. '61) p. 146
Checklist
Cost-cutting ideas
Case histories

2.0–2.4 Production

ORGANIZATION AND MANAGEMENT (2.1)

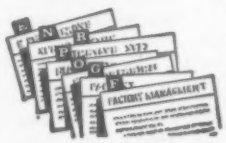
2.102 Paperwork and indirect costs (Nov. '61) p. 116
Checklist
Cost-cutting ideas
Case histories

PRODUCTION CONTROLS AND SYSTEMS (2.2)

2.206 Quality control and indirect costs (Nov. '61) p. 128
Checklist
Cost-cutting ideas
Case histories

METHODS AND TECHNOLOGY (2.3)

2.318 Tools, supplies, and indirect costs (Nov. '61) p. 140
Checklist
Cost-cutting ideas
Case histories



THIS FILING SYSTEM is designed to give quick access to past FACTORY articles that can help you solve your current operating problems. Here's how it works:

1. All major articles (set here in bold type) and many short items are classified according to a functional code.

2. Certain articles are also coded (see numbers in parentheses) to show secondary or closely related topics.

3. To use, cut up the items below. Paste them on 3x5-in. cards, file by code number. To cross-index, copy information on a second card, file by secondary code.

For ways to use your Guide, write Reader Service, FACTORY, 330 W. 42nd St., New York 36.

MATERIAL HANDLING AND LAYOUT (2.4)

2.404 Material handling and indirect costs (Nov. '61) p. 110
Checklist
Cost-cutting ideas
Case histories

3.0–3.4 Plant management

ORGANIZATION AND POLICIES (3.1)

3.104 The attack on indirect costs (Nov. '61) p. 82

3.104 Trends in indirect costs (Nov. '61) p. 84

3.104 10 critical indirect cost areas (Nov. '61) p. 86

3.105 Staff services and indirect costs (Nov. '61) p. 134
Checklist
Cost-cutting ideas
Case histories

3.105 Silence not golden in politics (Nov. '61) p. 222

PERSONNEL DEVELOPMENT (3.2)

3.205 What do you bid besides money? (Nov. '61) p. 225

3.205 Benefits bite—but not jobs (Nov. '61) p. 226 (3.309)

EMPLOYEE RELATIONS (3.3)

3.305 Workers cut costs, unemployment (Nov. '61) p. 225

3.307 Employee services and indirect costs (Nov. '61) p. 98
Checklist
Cost-cutting ideas
Case histories

3.310 Nine laws for nine lives (Nov. '61) p. 226

3.313 Sense worth a lot of dollars (Nov. '61) p. 222 (3.403)

3.314 White-collar tug-of-war (Nov. '61) p. 222 (3.303)

3.314 Bankrolling the brotherhood (Nov. '61) p. 222 (3.403)

NEW PRINCIPLE IN TORQUE CONTROL LOWERS ASSEMBLY COSTS

Rotor announces J-42T torque control air impact wrench with new hydraulic amplifier

- **NEW** unique hydraulic amplifier shuts off tool at desired torque. This exclusive device results in...
- **FASTER** rundown and impacting speed. Cuts job time.
- **MORE ACCURATE** torque control with uniform results. Quick, easy adjustment...tamperproof.
- **ASK FOR DEMONSTRATION** of the J-42T to see how this outstanding development can cut costs on your assembly line.

Write The Rotor Tool Company, 26300 Lakeland Blvd., Cleveland 32, Ohio.

Here's the RIGHT TOOL for YOUR job!

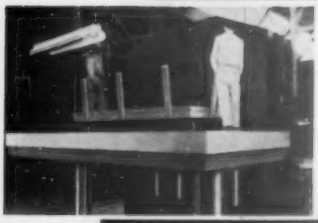
ROTOR TOOLS

The Rotor Tool Company · Cleveland, Ohio

SUBSIDIARY OF THE COOPER-BESSEMER CORPORATION

Lift anything WITH Rotary LEVELATOR LIFTS

PLANES



PLYWOOD

PAPER

PLANKS

CAPACITIES to 400,000 lbs. Dependable, economical hydraulic power. Standard models and specially engineered lifts for any industrial materials handling requirement. Mail coupon for information.

DOVER Dover Corp., Elevator Division
1068 Kentucky, Memphis 2, Tenn

Please send information on Rotary Levelator Lifts to:

Name_____

Company_____

Address_____

_____

6 **Circle 408 on Reader Service Card**

LETTERS

From crystal ball students

Dear Sir:

Your article "Production Gets a Crystal Ball That Works" (FACTORY, July 1961, p. 71) was extremely interesting. I want to know more about this relatively new "Line of Balance" technique. Are there other published materials I can use for further study and reference?

John B. Yasick

Industrial Engineer
The Ohio Leather Co., Girard, Ohio

►A U.S. Navy booklet, "Navexos P 1851," provides further details. Ask the nearest Inspector of Naval Material (offices in principal cities). He also may be able to steer you to companies in your area using "Line of Balance."—ED.

Dear Sir:

"Production Gets a Crystal Ball That Works" left me with one puzzling question. You state that "the number of parts or subassemblies at each monitored point is counted in the terms of end-product units." It seems to me that, in order for the line of balance to touch the tops of the bars each month, the number of parts at each monitored point should be cumulative —not the actual count.

H. Norris Love

President
Ideal Roller & Mfg. Co., Chicago, Ill.

►The caption under the set of charts should have read "Fig. 3 reflects cumulative inventory at checkpoints," rather than "current inventory." The statement in the text that "all entries are cumulative" (page 72) refers to all charts, not just Figure 1. Thanks for bringing this discrepancy to our attention.—ED.

Dear Sir:

After reading "Production Gets a Crystal Ball That Works," we're trying to determine how to apply this technique to our one-of-a-kind model shop operation.

Our main problem is choice of units for ordinate and abscissa of the "Objective" chart. Some think the abscissa should be expressed as a percentage of test set built; others feel it should be a weighted percentage based on the complexity of the operation.

Benjamin Fox

Supervisor, Engineering Model Shop
The Bendix Corp., Teterboro, N.J.

►Try using straight calendar time along the abscissa, with starting date at left and expected completion date at right. If the completion date has to be left open, just chart calendar time for any convenient period. On the date of a check, erect a vertical line on the objective chart. The status of the project is measured by the intersections of the several objective lines, representing project tasks, with the vertical line. Extension of the intersection points to the progress chart produces a line of balance.—ED.

Turn the page

A TREMENDOUS BOOST AWAITS ALL PLANT EXECUTIVES AT THE 1962 PLANT ENGINEERING & MAINTENANCE SHOW & CONFERENCE • JANUARY 22-25 AT CONVENTION HALL, PHILADELPHIA, PENNSYLVANIA

Pack your problems in your briefcase and bring them for discussion with over 350 exhibiting companies and their engineers. Informative, exciting exhibits for you to see in every important field:

Air conditioning, heating, ventilating – building materials and services – communication systems – electrical equipment – instruments – inventory and work control systems – lubricants and lubricating equipment – maintenance tools and supplies – materials handling equipment – plant furniture – plant protection equipment – pollution control – plumbing equipment – power generation and distribution – finishes and finishing equipment – power transmission – safety equipment – sanitation and cleaning equipment – storage equipment – welding

An outstanding concurrent conference, too, with 44 separate sessions covering a great range of engineering and maintenance subjects. Here, in show and conference, are information, education, and stimulation that have no equal all year long – and they are all yours in just four busy, rewarding days. Come – and you'll see!

Address all inquiries to: **CLAPP & POLIAK, INC.**, Show Management, 341 Madison Avenue, New York 17, New York, MUrray Hill 4-3432.

AND PENNSYLVANIA

KEYSTONE OF INDUSTRY

New Partners in Industrial Growth

General Electric chooses Pennsylvania as the site for its new Space Technology Center

"We made a nationwide study before selecting Greater Philadelphia for our permanent home," says H. W. Paige, General Manager of General Electric's Missile & Space Vehicle Department.

The decision to build this Space Technology Center near Valley Forge was influenced by a number of factors. "We were able to hire many of our 1500 scientists and engineers within a 100-mile radius, and we found an abundance of technically competent small businesses to do subcontract work. Excellent air and surface transportation provides easy access to missile launch sites, defense establishments and other major defense and space contractors.

"The attractive residential communities, outstanding schools, colleges and cultural activities; and Philadelphia's dynamic program of community improvement—which should continue to enhance the area's attractiveness to our professional personnel—also influenced our decision.

"Building this 800,000 sq. ft. center, while continuing to occupy a 600,000 sq. ft. facility in Philadelphia's 'University City' is proof we believe Greater Philadelphia is admirably suited to the needs of a modern research and development business."

Investigate the potentials of a Pennsylvania plant location now! Write for:

- Facts on "100% Financing For Your New Plant in Pennsylvania"
- Full details on Pennsylvania's excellent "Tax Climate"
- "Plant Location Services" brochure
- Current listing of available industrial buildings and sites
- Special reports and tabulations, tailored to your specific location requirements, covering—Labor, Markets, Transportation, Materials, Minerals, Water Power, Fuel, Engineering Facilities, Taxes and Community Data

ADDRESS INQUIRIES TO:

PENNSYLVANIA DEPARTMENT OF COMMERCE

DIRECTOR OF INDUSTRIAL DEVELOPMENT

Room 426 • South Office Building • Harrisburg, Pennsylvania

Phone: CEdar 4-2912

Begins on page 6

LETTERS

Danger recognized

Dear Sir:

"The Dangerous Business of Defense Contracting" (FACTORY, August 1961, page 92) is very appropriate, and reflective of many of our experiences. This article should be required reading for manufacturing personnel in other than defense business, too.

May we have permission to reproduce this article for distribution to all members of our management and union officers?

L. B. Larkin, Jr.
Personnel Manager
Chrysler Corp. Tank Plant
Detroit, Mich.

►**Thank you. Permission to reprint is granted.—ED.**

Dear Sir:

I have read "The Dangerous Business of Defense Contracting" (FACTORY, August 1961, page 92) and "Public Control of Industry Affairs" (July 1961, page 61).

This type of reporting makes me happy. You are trying to do something that I have been trying to do for a long time: Cut waste in the nation's defense establishment. Your effort is all the more meaningful because you represent a force within that segment of private industry which is producing the weapons and materials for our country's defense establishment.

For the welfare of industry, government and the country, I commend your efforts to make private man-

FACTORY welcomes opinions and suggestions from its readers. They help us put management problems in better perspective. Letters should be addressed: The Editor, FACTORY, 330 West 42nd St., New York 36.

for the one company that can

DESIGN, ENGINEER, MANUFACTURE *and* **INSTALL**

A COMPLETE BALING SYSTEM...

or any part of it...

The CYCLOMATIC BALER, long recognized as the leader in the field, is the heart of the Cyclomatic System. Here is the ultimate in a horizontal, hydraulically operated baler that features automatic high density baling with automatic baling pressure control. Dust-free operation assured.

SEE

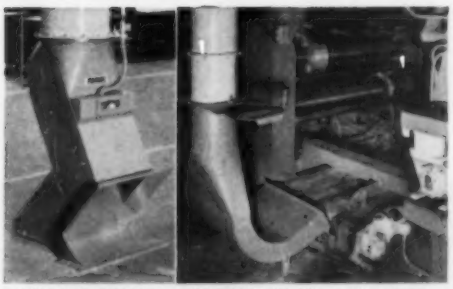
BALEMASTER

No matter what your problem, *BALEMASTER has the answer!*

Here, under one roof, is a team of scrap paper handling and baling specialists that will provide you with a modern *completely automatic* Cyclomatic System . . . or modernize or rebuild your present system.

For the system that will meet all your needs to perfection get in touch with BALEMASTER—the only company which does the complete job. Undivided responsibility and guaranteed satisfaction is made certain by field and factory trained personnel long experienced in automatic baling.

Professional consulting service is also available.

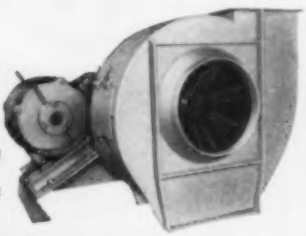


PICK-UP FEEDERS MACHINE MOUNTED TAKEOFFS

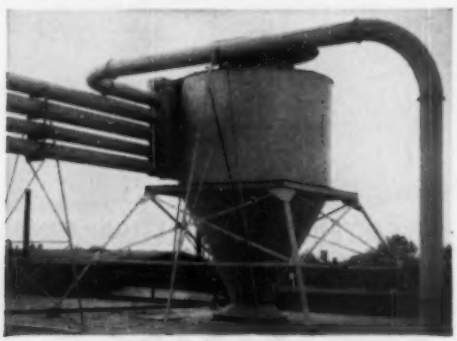
Pickups, designed as integral parts of the Cyclomatic System, can be electrically interlocked one to another or to other component parts of the system. Made of extra heavy gauge metal.

EXHAUSTERS

Exceptionally strong and sturdy exhausters have been specifically designed for properly preparing materials for efficient pneumatic conveying and correct baler feed.



CYCLOMATIC PINCH TABLE CONVEYOR and HOGGER, noted for enduring service, crushes bulky scrap and tears it to pieces for efficient air conveying and baling. Designed and engineered for heavy duty. All parts are sturdy, built for rugged, continuous operation.



CYCLONE SEPARATOR

Scrap is air-conveyed through welded and flanged pipe to the cyclone separator which is scientifically engineered and designed for each individual application to insure the efficient delivery of material to the baler.

Write for full information today

EC EAST CHICAGO MACHINE TOOL CORP.

Balemaster DIVISION OF

EAST CHICAGO MACHINE TOOL CORPORATION

4801 Railroad Ave. • East Chicago, Indiana • Phone: EXport 7-7479

Staple-nailing expendable skids, crates and boxes.

Portable stapling plier solves carton assembly problem.

Attaching shipping tags to filled corrugated cartons.

Fastening liners and protective pads to shipping containers.

DUO-FAST gives you four "extra men" in your packaging and shipping departments

One man, plus a DUO-FAST Stapler, can outwork four men using old-fashioned fastening methods on industrial packaging. And that adds up to money saved.

Whether it is staple-nailing crates, assembling corrugated cartons, lining box cars, or attaching labels to filled cartons . . . DUO-FAST has the correct model and staple needed to do a good job, and do it fast!

You'll like DUO-FAST. You'll like the Free Service Guarantee. Write for the FT-17 Industrial Packaging Brochure, and the address of your DUO-FAST representative.

FASTENER CORPORATION 3702-10 River Road, Franklin Park, Illinois 1270

DUO-FAST Staplers Tackers Staples

Everything you need for tacking, stapling and nailing.

Begins on page 6

LETTERS

agement and ownership aware of their responsibilities.

(Hon.) Frank Kowalski
Member of Congress (Conn.)
Washington, D. C.

Strike losses rise

Dear Sir:

There is a basic oversight in the example strike loss calculation in "Labor's Strike Loss at a Glance" (FACTORY, August 1961, page 144). Apparently the entire 20 cents is considered a strike gain. But say there was a pre-strike company offer of 15 cents, not unlikely. Then only 5 cents should be considered the gain. The resultant time required to amortize the strike losses would be increased several times.

J. F. Reeder
Manager, Schnadig Corp.
Montoursville, Pa.

►**Mr. Reeder's calculation method is correct.—ED.**

FACTORY

November 1961 Vol. 119, No. 11

A consolidation of Factory Management and Maintenance and Factory and Industrial Management including Factory, and Maintenance Engineering. Published monthly by McGraw-Hill Publishing Co., Inc. James H. McGraw (1860-1948), Founder.

Executive, Editorial, Circulation, and Advertising Offices: McGraw-Hill Building, 330 W. 42nd St., New York 36, N.Y. Telephone: Longacre 4-3000. Teletype: TWX N.Y. 1-1636. Cable address: McGRAWHILL, N.Y.

Printed in Albany, N.Y.; second-class mail postage paid at Albany, N.Y., and at additional mailing offices. Title ® Registered in U.S. Patent Office. © Copyright 1961 by McGraw-Hill Publishing Co., Inc. Quotations on bulk reprints of articles available on request. All rights reserved, including the right to reproduce the contents of this publication, either in whole or in part.

Officers of the Publications Division: Nelson L. Bond, President; Shelton Fisher, Wallace F. Traendly, Senior Vice Presidents, John R. Callaham, Vice President and Editorial Director; Joseph H. Allen, Vice President and Director of Advertising Sales; A. R. Venezian, Vice President and Circulation Coordinator; Daniel F. Crowley, Vice President and Controller.

Officers of the Corporation: Donald C. McGraw, President; Hugh J. Kelly, Harry L. Waddell, Executive Vice Presidents; L. Keith Goodrich, Executive Vice President and Treasurer; and John J. Cooke, Vice President and Secretary.

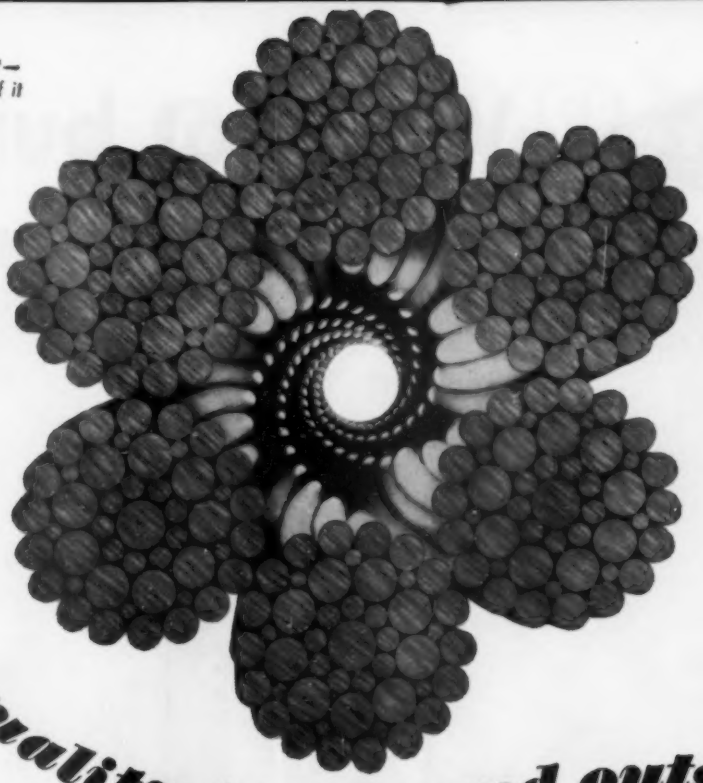
Subscription price: Available only by paid subscription. Publisher reserves the right to refuse non-qualified subscriptions. FACTORY solicits subscriptions only from production, maintenance, and management executives, and engineers in manufacturing plants.

Please indicate company connection and title on all subscription orders and forward to address shown in box below. U.S. subscription rate for individuals in the field of the publication: $2 per year; single copies $1. Canadian and foreign rates on request.

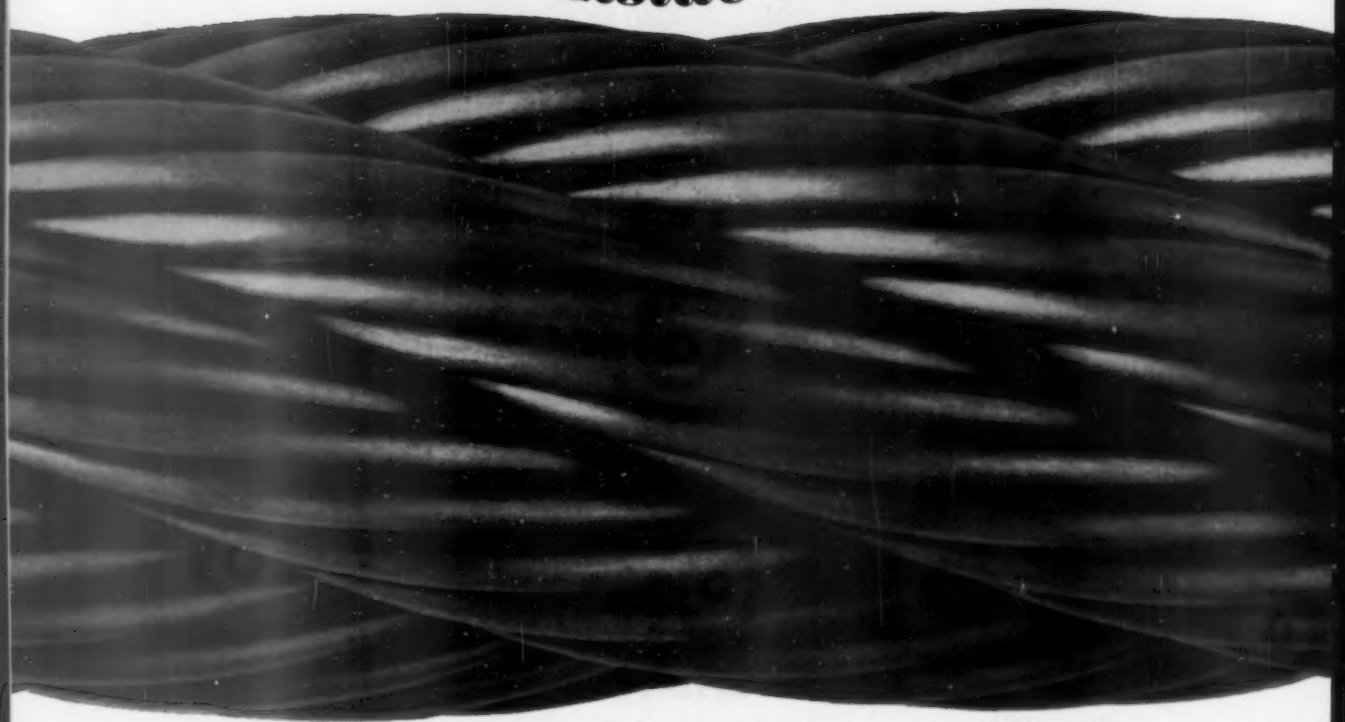
UNCONDITIONAL GUARANTEE: Our primary aim is to provide subscribers with a valuable publication. Your comments and suggestions for improvement are encouraged and will be most welcome. If editorial service is unsatisfactory, the publisher, upon written request from any subscriber to our New York office, agrees to refund the part of the subscription price applying to copies not yet mailed.

Subscriptions: Address subscription and change-of-address correspondence to Publishment Manager, FACTORY, 330 W. 42nd St., New York 36, N. Y. For change of address, state old and new address, including zone, and allow one month.
Postmaster: Send Form 3579 to Fulfillment Manager, FACTORY, 330 W. 42nd St., New York 36.

We put a lot of work into it—
You get a lot of work out of it



Quality inside and outside



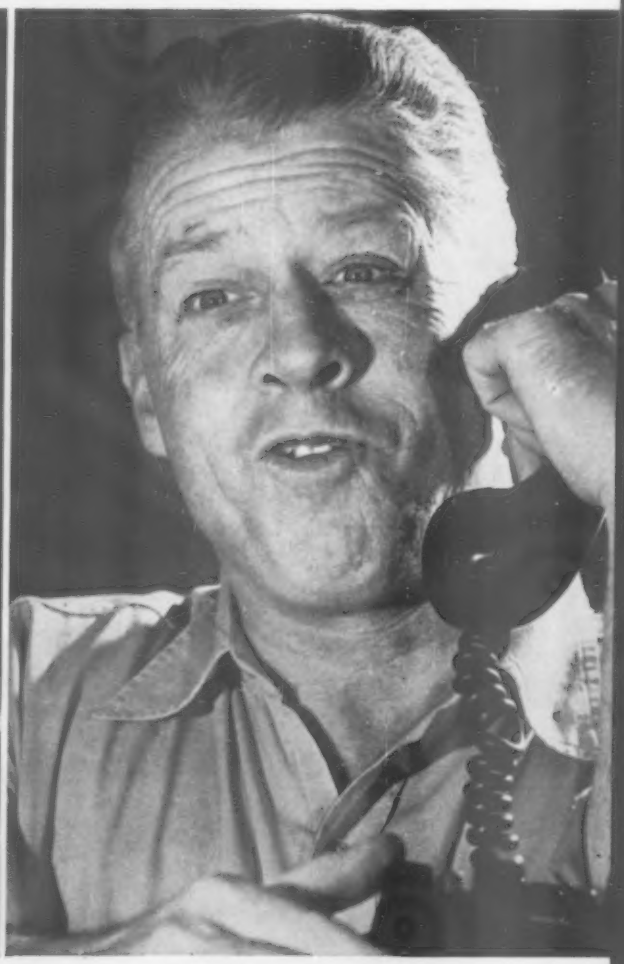
Two important angles on wire rope savings: the *quality* and *uniformity* Roebling builds all the way through Royal Blue Wire Rope. They give you a big, extra margin of service through every kind of wear and tear — and combine to make extra strong Roebling Royal Blue the toughest wire rope you can buy. Find out more from your wire rope distributor, or write for free booklet to Roebling's Wire Rope Division, Trenton 2, N. J.

ROEBLING

Branch Offices in Principal Cities
John A. Roebling's Sons Division
The Colorado Fuel and Iron Corp.

GOODYEAR

Why not buy hose



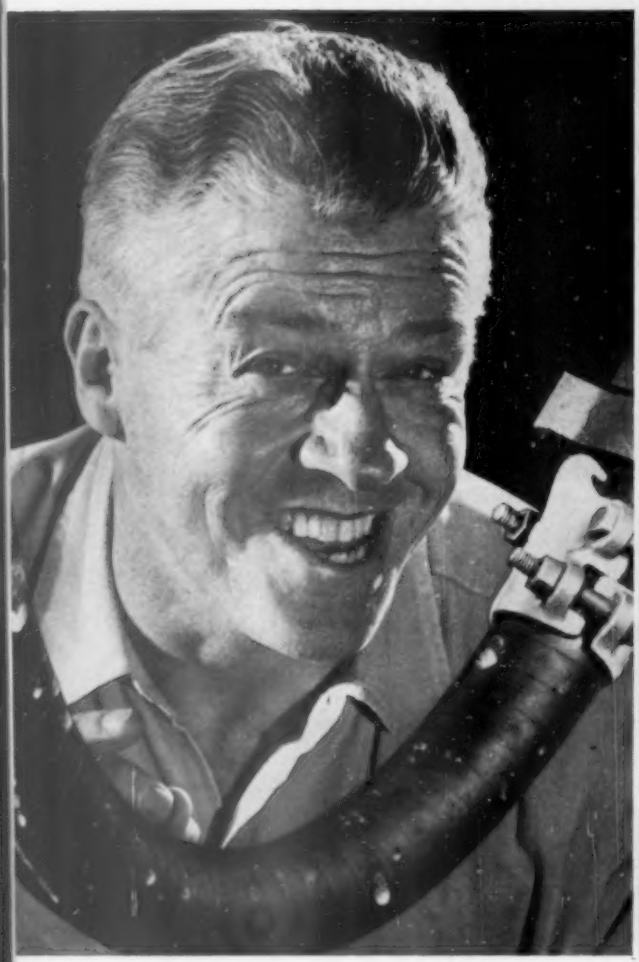
YOU GET THE RIGHT HOSE
(With the world's largest, most diversified line of industrial hose to choose from, *it's easy with Goodyear!)*

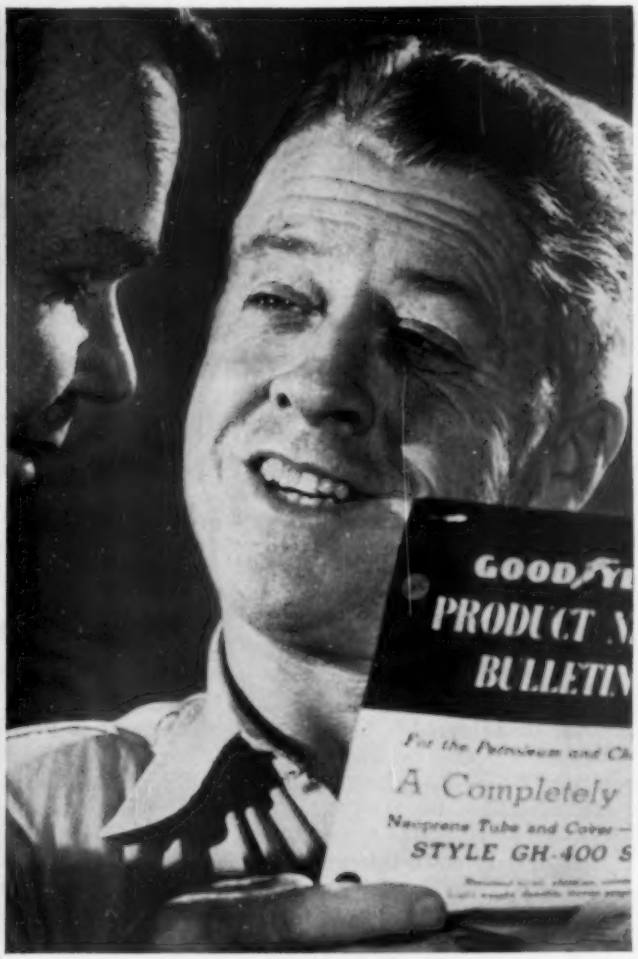
YOU GET FAST DELIVERIES
(With a big, nationwide network of stocking distributors to serve your needs, *it's easy with Goodyear!)*

For the right hose... at the right place... at your Goodyear Distributor... first in service

Lots of good things come from **GOOD**

the easy, Goodyear way?





YOU GET UNMATCHED QUALITY
(With more than 50 years of pioneering research and development backing hose quality, *it's easy with Goodyear!)*

YOU GET EXPERT ADVICE
(With a trained hose expert like the G.T.M. – Goodyear Technical Man – always on call, *it's easy with Goodyear!)*

the right time... at the right price... call with all industrial rubber products

Or write Goodyear, Industrial Products Division, Akron 16, Ohio

GOODYEAR INDUSTRIAL PRODUCTS

Could this strike have been avoided? How? Compare your solution with that of labor expert . . .

George Odiorne

When these dissatisfied plant workers decided to organize their own union, the power went to their heads. "Even when they're wrong, they want it their way," growled the labor manager. "It's time we taught them a lesson." But it was a costly lesson for the plant, too.

"This strike couldn't have come at a worse time," moaned the plant manager for Cosmic Container Company. "We've just broken into some new markets and our sales force has worked like the devil to get some new business away from competition. Now we have to have this shutdown that will send them flying back to their other suppliers."

"On the other hand," grunted the labor relations manager, "this is a strike we had to take. Otherwise, we'll continue to be chipped away as we have been for the past four years. It's now or never. We've got to make the union start living up to its agreement or its demands will put us out of business."

For many years Cosmic had been non-union, despite the fact that it was located in a highly industrialized center, and had been the object of many organization drives by international unions. Actually, the men hadn't wanted a union in the first place, but felt forced into it by the unfair and high-handed activities of some of the key foremen in the plant.

A string of arbitrary discharges, abrupt demotions for petty causes, strict policing of petty regulations, and little recourse for any unfairness had caused the whole plant to become thoroughly fed up with shop management. And union members in the nearby plants began to urge them to take action against this kind of shoddy treatment.

In 1957, after several incidents that aroused a lot of resentment, several of the more vocal employees formed a committee and went to management demanding more reasonable rules. A particular sore point was the rule docking a man an hour's pay if he were over ten minutes late. Despite their threats to take the matter to the Wage and Hour Board, the men were rebuffed curtly. They immediately decided to organize a union, and approached several internationals for advice. They found little there that pleased them. In every case the organizers were rough men, and didn't effectively sell the advantages of joining an international. Following the last of these, Peter Harris, leader of the committee, said:

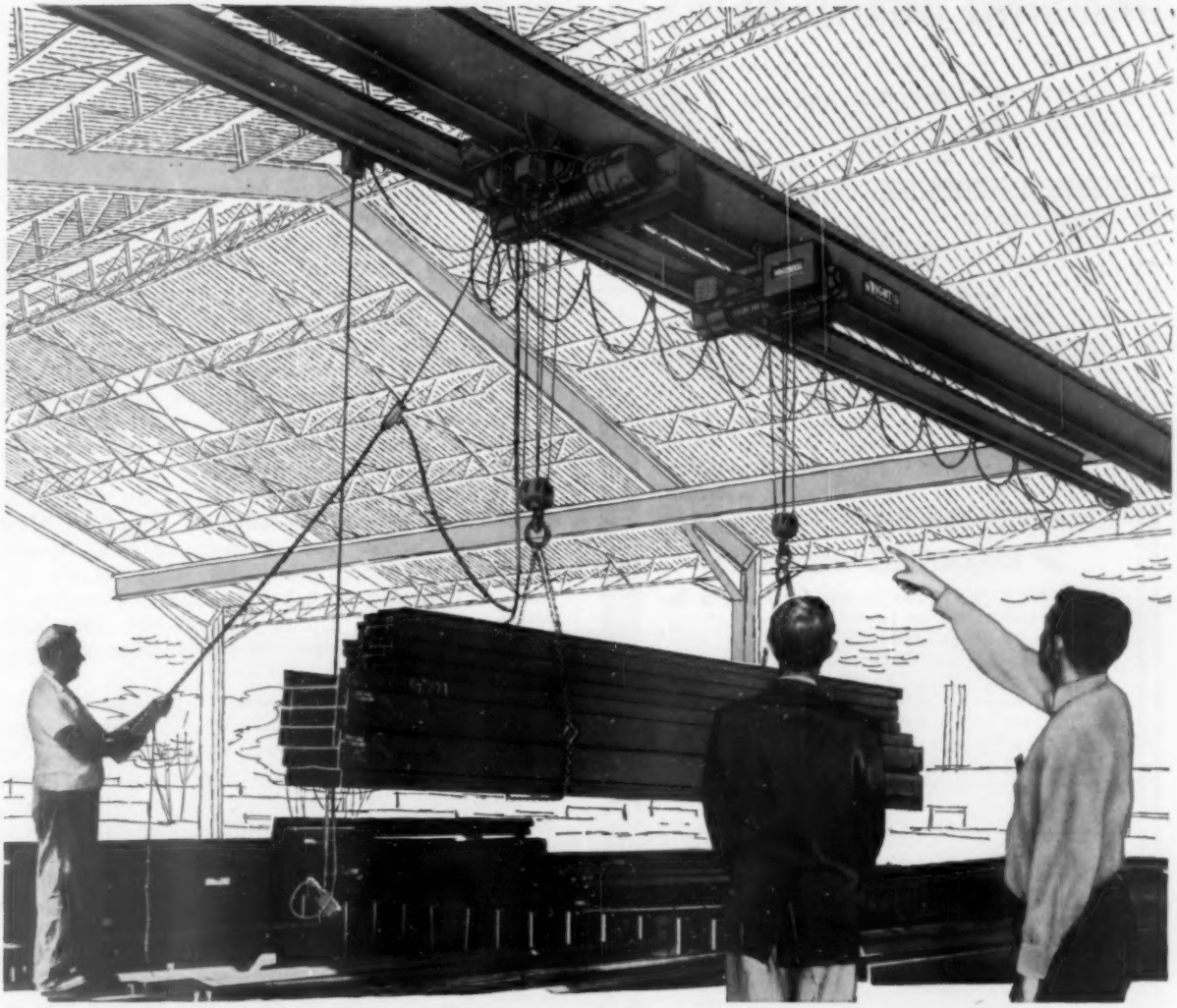
"I think we know enough now to form our own independent union in this plant. I've taken some evening courses and have a friend who works for the NLRB who will explain the procedures to me. Let's start our own union, elect our own officers, and get certified by the government."

That night they mimeographed letters to their fellow workers, and hired a man to distribute them at the plant gate the next morning. The message said, in part:

"We know that most of you have been against joining the AFL or CIO, but if we form our own union and run it ourselves, we can keep all our own dues money, elect our own officers, and make our own demands without being called out on strike because some outsider says we must."

This argument proved appealing to the workers. Cards were quickly obtained, and an election was called. Two or three other unions were able to get on the ballot, but the independent union won handily. Shortly after this, the committee was elected to union office, and sat down and wrote a contract with the company, which included a four-step grievance procedure ending in arbitration.

Things were rough between the company and the



"It's a WRIGHT Crane...custom-built to our specifications!"

Specifying the right crane for heavy overhead loads is a "tall order," as well as an important capital investment. Before specifications can be drawn, several basic questions must be answered. Where is the crane to be used? What kind of loads will it lift? What design of crane and auxiliary equipment will handle these loads most efficiently? And last, what manufacturer can produce a crane that will meet these requirements?

Hundreds of companies, large and small, have found the best answers to these and other questions at WRIGHT. At WRIGHT, every crane is custom-engineered to assure that all phases of design, construction and operation are perfectly coordinated to the requirements of the job. Factors such as precision control, safety, handling efficiency and operating costs are carefully weighed before final specifications are drafted.

If you have a material-handling problem which calls for customized crane engineering, we invite you to let WRIGHT engineers help you solve it. Please address your inquiries to York, Pennsylvania.

Remember—WRIGHT also makes a standard crane line including motor-driven and hand-operated cranes—top-running and underhung.

In Canada: **UPTON, BRADEEN & JAMES LTD., Montreal, Ottawa, Toronto, Hamilton, Windsor, Winnipeg, Vancouver**

WRIGHT CRANES

Wright Hoist Division • American Chain & Cable Company, Inc.

York, Pa., Atlanta, Chicago (Melrose Park), Denver, Detroit, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, San Francisco, Bridgeport, Conn.

ACCO

For more facts Circle 415 on Reader Service Card

DRAWING BOARD NEWS No. 4

Published by Chart-Pak, Inc., originator of the tape method of drafting

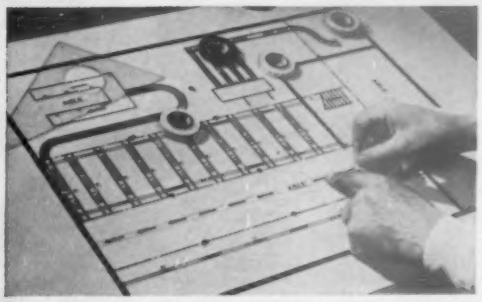


CHART-PAK TAPES LIGHTEN THE LOAD OF OVERWORKED DRAFTSMEN

Chart-Pak is good news for designers and draftsmen. It cuts down on routine "pencil pushing." It allows more time for really creative work.

Lines, bars, shapes, patterns and symbols are all pre-drawn. With Chart-Pak, they come on pressure sensitive tapes and sheets. They just *press* down . . . quickly, neatly.

Even curved lines, as small as ¼" wide can be "taped on." And Chart-Pak is "goof-proof." It is easily removed for corrections . . . yet won't come off accidentally.

NEW TAPES FOR BETTER PHOTOGRAPHY

New "matte surface" acetate fibre taps introduced by Chart-Pak, reproduce "clean as a whistle." They are designed to eliminate highlights and "hot spots" in photo-reproduction—and are extra thin, too, to eliminate edge shadows. The matte finish can be written on, with pencil or ink. Widths from ¼" to 2"—in choice of ten colors.

Chart-Pak helps Budd Company keep track of costs, operations

Charts of important variables in four Budd plants are kept up to the minute the easy way — with Chart-Pak Materials.

Popular everywhere . . . Many leaders of American industry use Chart-Pak Materials extensively. For example: American Bosch Arma; American Cyanamid Company; Grumman Aircraft; Florida Power & Light; Kaiser Aluminum and Chemical Corp.; Michigan Bell Telephone; Smith, Kline, & French Laboratories; Union Carbide; Western Electric; plus many, many more.

NEW! "TAPE-SAVER" PACKAGE

WRITE FOR FREE CATALOG OF Chart-Pak pressure-sensitive materials. It's powerful "medicine" for overworked draftsmen!

CHART-PAK, INC.

ORIGINATOR OF THE TAPE METHOD OF DRAFTING

103 RIVER ROAD, LEEDS, MASSACHUSETTS

Dealers in principal cities in U. S. and Canada

ON STRIKE . . . *Begins on page 14*

union from the beginning. Changing habits of supervision was difficult, especially when the management resisted union demands at every step. The people in the plant became dissatisfied with the union's efforts and began to push the officers for more concrete changes in working conditions.

The union, meanwhile, was having trouble controlling a number of its stewards. In 1959, for example, the stewards in one department filed a grievance about the heat one summer afternoon, and when no answer was forthcoming the next day the whole department walked off, with the stewards leading them. The union officers tried to stop the walkout, and called a mass meeting. It was a pretty unruly affair. Shouts of discontent and insults flew across the hall, and after hours of argument, most of the union officers resigned as a group.

The dissident stewards who had led the wildcat ran for office as a team and landed all the key offices. Their theme was "action" and whatever else could be said of them, they provided plenty of it. They passed a rule that any grievance not honored within 24 hours would result in a walkout. During the next year, there were thirteen walkouts either in the whole plant or one or more departments.

Meanwhile, the plant manager, who had been the architect of the strict policies and intractable management attitude, was transferred to another division. The new plant manager had successfully run unionized plants for many years. He invited the officers in for a talk, and explained that he intended to initiate supervisory training and alleviate some of the bad human relations management in the plant. He asked the union officers to abide by the contract and let the grievance machinery work. The officers didn't comment, but walked out.

Five more wildcats hit the plant during the next two months, and in each case the new plant manager had worked out an immediate adjustment. At that time he relieved the old personnel manager, and asked for a professional labor relations man to help him cope with the growing labor problems that were beginning to cut the plant's productivity.

Headquarters sent in Mike Coster, who began at once to shape up the contract administration procedures. All grievances were reported to his office immediately and decisions were reached more quickly. He held briefing sessions for foremen on contract administration. He explained company rights and duties to the supervisors. This solved most of the walkouts, but not all.

One category of grievance was still likely to trigger a walkout; the kind that went against the union—even when it was promptly decided.

"I think we've reached the end of our rope, boss," Mike told the plant manager. "These guys aren't living up to their bargain. Even when they're wrong they want their way, and we can't run a shop that way. I think they need a lesson. I suggest that the next time they walk out without taking the matter through to arbitration, we let 'em stay out until they come back on our terms—which is strict compliance with the bargain we've signed with them."

Turn to page 22

How rust penetrating metal primers work

IN ALL GOOD METAL PRIMERS

OILS PENETRATE

THROUGH RUST

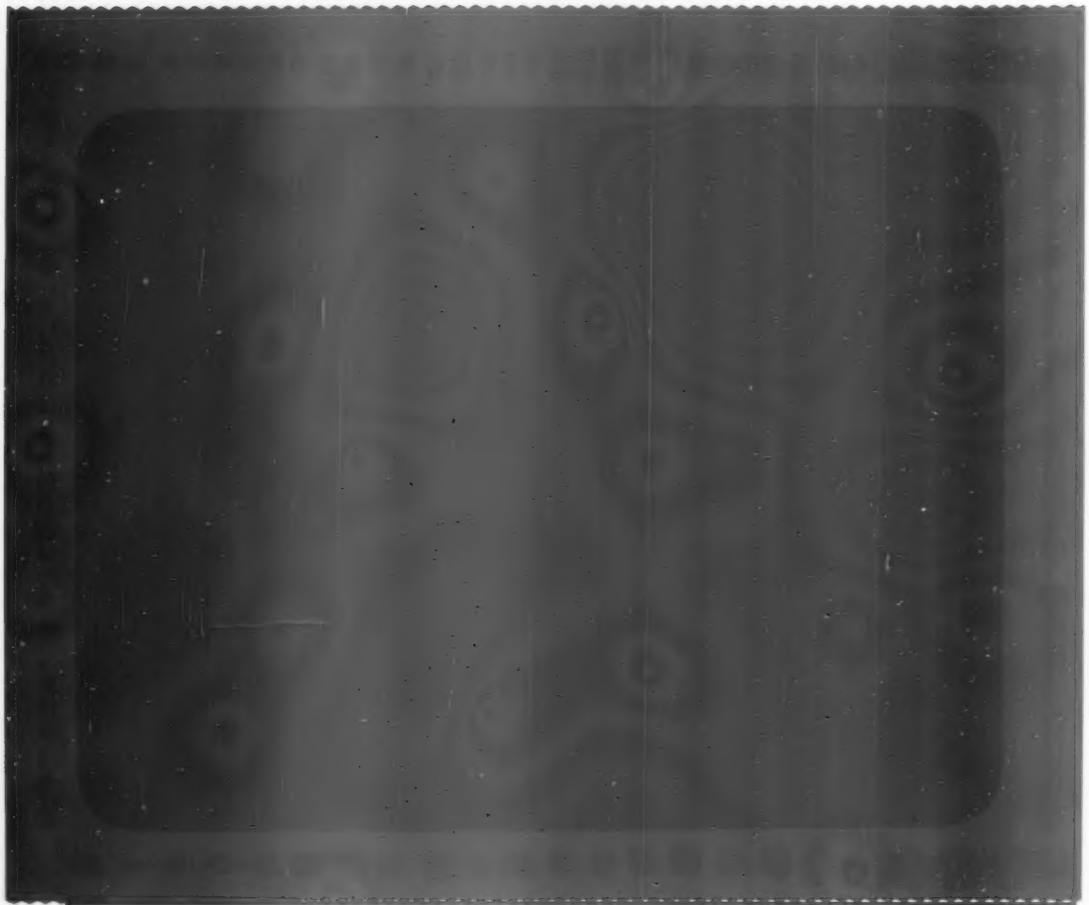
TO BASE METAL

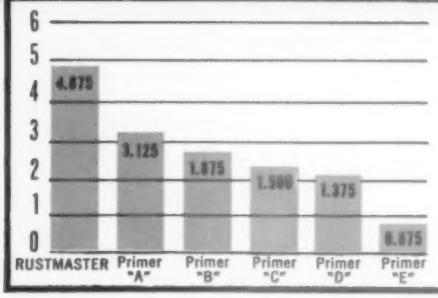
BUT...

LASTING RUST PROTECTION

and RUSTMASTER

with Glidden No. 358 phenolic penetrating oil*



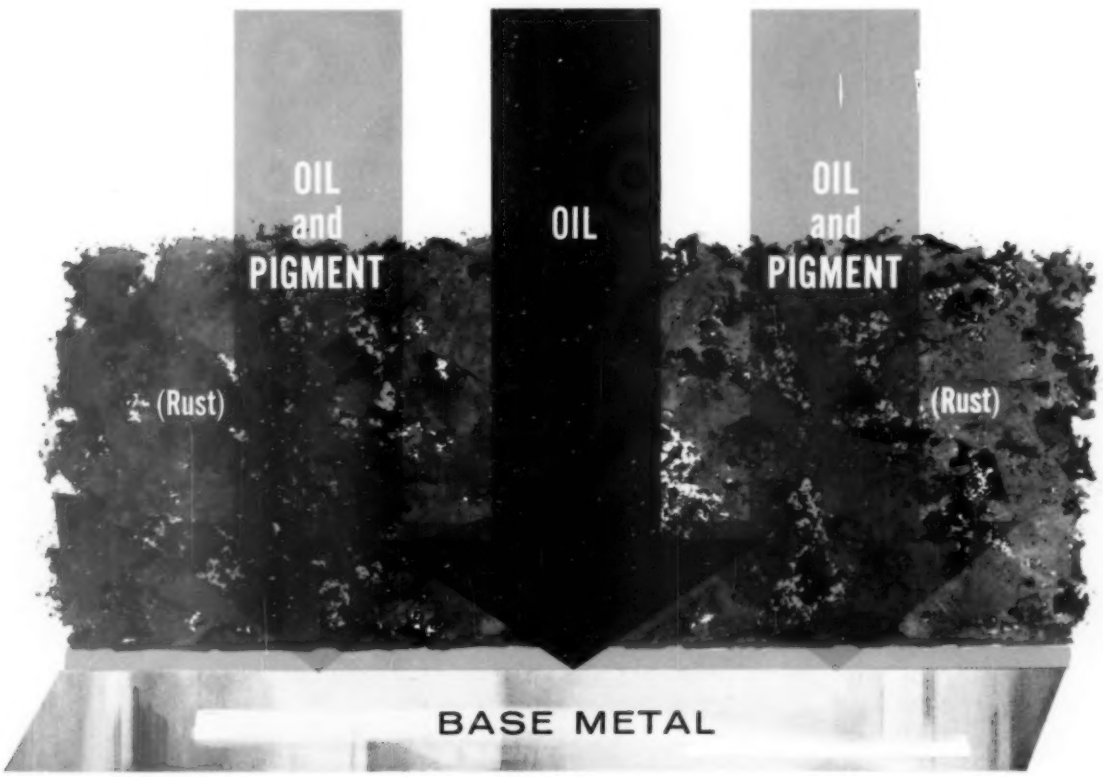


Comparative Test Results—Pre-rusted panels plus cold rolled steel panels coated with RUSTMASTER and competitive primers were exposed for 500 hours, 5% salt spray at 15° from vertical. Similar panels were also exposed for 1000 hours at 95°F. and 95% relative humidity. The results were rated under the A.S.T.M. method with "0" signifying complete failure, and "10" representing perfect protection. Average ratings for RUSTMASTER and the five competitive primers were computed. The results shown at left clearly indicate the greater metal protection now possible with RUSTMASTER.

*Reg. U. S. Pat. Off.

IS IN THE PIGMENT...

gives double penetration of both oil and pigment



Double penetration is necessary to stop and prevent rust. Both the oils and the anti-corrosive pigment must reach deep down through the rust layers if the primer film is to provide maximum protection.

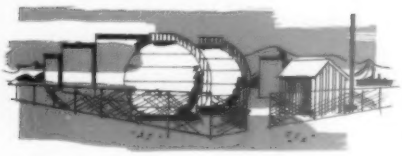
RUSTMASTER contains #358 phenolic penetrating oil, a superior wetting agent which penetrates through tight layers of rust to the bare metal surface. Corrosive air and moisture—trapped in microscopic pores—are forced out, and a firm bond is formed with the substrate.

#358 phenolic penetrating oil also carries the pigment down through the rust layers to the base metal, where it inhibits the corrosive action that may be caused by future penetration of moisture and air. This provides lasting rust protection.

The RUSTMASTER Protective Maintenance System

Factories, Water Towers

Structural Steel



Storage Tanks, Fences, Metal Buildings

Fire Escapes, Decorative Metal

Bridges, Highway Markers

Best results from any Protective Maintenance System are obtained when metal surfaces are properly cleaned and completely free of rust. But . . . in many cases, it is impossible to sandblast or utilize other effective methods of surface cleaning. Hard-to-reach locations, such as cracks and crevices around joints, nuts and bolts, are difficult to clean.

RUSTMASTER Tank and Structural Primer, with its unique penetrating properties, is scientifically designed to combat the rust that remains after average surface preparation.

FAST, EASY TO APPLY—RUSTMASTER metal primer can be applied by spray, brush or roller. Thorough wetting action means complete coverage and hiding plus maximum penetration without extra brushing over rough or irregular surfaces.

RAPID DRYING—With new RUSTMASTER, the waiting period before applying finish coat is now hours instead of days. Under normal drying conditions, RUSTMASTER dries to touch in eight hours and can be recoated after overnight drying.

RUSTMASTER Tank and Structural Enamel is the ideal finish coat to use over RUSTMASTER Tank and Structural Primer. A long-oil, high-build alkyd enamel, it gives the heavy, tough, elastic film that is necessary to resist contraction and expansion (thermal shock) of large metal surfaces such as steel storage tanks.

RUSTMASTER Tank and Structural Enamel resists the roughest weather. It provides the finest protection with maximum economy when used over RUSTMASTER primer. May be used on wood or masonry as well as metal.

RUSTMASTER Tank and Structural Enamel is available in ready-mixed colors, aluminum, and black, plus a self-cleaning white and a tinting white for mixing hundreds of additional colors.

RUSTMASTER
Heat-Resisting Finishes

Other RUSTMASTER finishes with outstanding qualities of performance include these self-priming products—

NO. 5228 HEAT-RESISTING ALUMINUM for temperatures of not less than 500°F, and not more than 1200°F.

NO. 5223 HEAT-RESISTING BLACK, which contains ceramic pigments to provide resistance to color loss on surfaces with temperatures of not less than 500°F, and not more than 1200°F.

Write in today for complete information on how the RUSTMASTER *system can help you in your protective maintenance program.*

THE GLIDDEN COMPANY
COATINGS AND RESINS DIVISION
900 Union Commerce Building • Cleveland 14, Ohio
In Canada: The Glidden Company, Ltd., Toronto, Ontario

QUALITY Glidden PRODUCTS General Paint

© 1961

Shell Tellus Oils are refined and formulated to meet exacting hydraulic service requirements, such as in this forming machine.

PHOTO COURTESY ATLANTIC PLASTICS INC., STAMFORD, CONNECTICUT

BULLETIN:

Shell provides a quick 6-point check list for hydraulic oils: Use it to pick the right oil for your needs

Selecting the proper hydraulic fluid for your equipment can be one of your most important decisions. And it can pay off in many ways. Less down time. Lower cost per unit. Longer equipment life.

Here are six bench marks to help you pick the best hydraulic oil for your plant requirements.

1. Does it have good oxidation stability? Oxidized hydraulic oil can form gums, lacquers and other deposits which may foul moving parts. Shell Tellus Oils are carefully refined to remove unstable, sludge-forming components, then fortified with a Shell-developed oxidation inhibitor.

2. Will it resist foaming and emulsification? Pump chatter and erratic operation are often the result of pump cavitation, brought on by oil foaming. Tellus® Oils contain powerful additives to help prevent foaming.

They also contain a selected inhibitor to combat effects of moisture that might be in the system.

3. Does it fight rust and corrosion? It is difficult to exclude all moisture from a hydraulic system. And moisture can form troublesome rust. Shell Tellus Oils have been carefully compounded to resist corrosion.

4. What are its lubrication qualities in continuous service? Shell Tellus Oils form a clinging, oily film on mating metal surfaces. This maintains a constant guard against wear.

5. How does it react to temperature changes? This is a key factor in the performance of hydraulic equipment. Careful selection of the proper viscosity grade of Tellus assures satisfactory operation of your system over its entire temperature range.

6. Is it available in several viscosity grades? Shell Tellus Oils are available in a broad range of viscosity grades. There's a special grade for virtually every hydraulic requirement.

Ask your Shell Industrial Products Representative for facts on Tellus Oils. Or write: Shell Oil Co., 50 West 50th St., New York 20, N. Y.

A message to manufacturers of hydraulic equipment

There is a Shell Tellus Oil suited for your equipment.

1. Your customers can get Tellus Oils at Shell depots everywhere. Readily available throughout the world.

2. Quality is consistently high. Tellus always delivers top performance.

SHELL

A BULLETIN FROM SHELL
—where 1,997 scientists are working to provide better products for industry

For more facts Circle 418 on Reader Service Card

WHO USES

Rubbair®

the true door . . not a curtain

Doors?

A Rubbair Door installation at the warehouse of S. Kann & Sons Company, Hyattsville, Maryland

THE S. KANN SONS CO.

Washington, D. C.

READ THIS ACTUAL CASE HISTORY . . .

In response to your letter of March 25, we are happy to inform you that we are very pleased with the Rubbair Doors that were installed about 3 years ago in our warehouse at 5620 Ager Rd., W. Hyattsville, Md. They have held up well and have satisfactorily performed their function of keeping cold air out of the building while allowing easy passage of merchandise through the doorways. If we were to build a new warehouse, we would duplicate the Rubbair door installation.

Sincerely yours,
B. B. Bergunder, Jr.
Vice President

RUBBAIR DOORS flex on impact because of their construction. They absorb high traffic punishment from the constant pounding of fork trucks, material handling equipment, packing boxes and cases. The 'flex' and 'bounce' features of RUBBAIR DOORS give you longer, factory-tested door life and extremely low maintenance costs.

RUBBAIR DOORS assure trouble free operation with . . .

- **Flexible Construction**
- **Rugged V-Cam Hinges**
- **Scuff-resistant Wear Panels**
- **Shatter-proof Windows**
- **Safety Cushion Nose**
- **Positive Air Seals**

If you have an industrial or warehouse door problem, let us help you solve it. Write us about it, or send for free catalog.

Stic-Klip®

MANUFACTURING CO. INC.
RUBBAIR® DOOR DIVISION
60 Regent Street
Cambridge 40, Mass.

Distributorships available in protected territories.

ON STRIKE. . . *Begins on page 14*

The showdown wasn't long in coming. Management cut down on overtime in one department and the union filed a grievance. The company rejected the union contention that this was a contract violation. The people in the affected department walked out, led by their stewards. The rest of the plant soon followed. The company closed the doors and refused to discuss the case until every employee was back at work, and the case had exhausted the remedies of the contract spelled out in the grievance procedure.

Six weeks later, the men returned to work—on the company's terms.

Now George Odiorne tells how this strike could have been avoided

There's no doubt that this strike could have been averted. First, by correcting, in time, the poor supervisory conditions that led the employees to organize. The men didn't really want a union, and rejected the international. Once in, their independent union proved inexperienced in the ways of collective bargaining; in fact, it acted irresponsibly—but more from ignorance of what a union can and cannot legally do than from malice.

Faced with such a situation, the company took proper steps to correct the underlying discontent. It also wisely put a professional in charge of its union relations. The next logical step was to educate the union to its responsibilities. The kind of thing that took place between the plant manager and the union officers was a good beginning, but wasn't enough. Faced with amateurs in unionism, it was management's responsibility to help the union learn how to function properly.

One such step might have been to bring a company attorney into the picture and start legal action to prevent violations of contract. This would have probably forced the union to hire a lawyer for defense and the union lawyer could have taught the officers and members what their rights and duties were. He could have shown them why it would be prudent to stop the wildcats until the remedies of the grievance procedure had been exhausted.

Perhaps another way would have been to communicate directly to employees through talks by supervisors, through letters sent to their homes, or maybe through the house organ. Such communications could have explained the wrong nature of the wildcats from the viewpoint of the contract and the law.

Perhaps an unfair labor practice charge against the union would have had a good effect.

The strike was educational for the union it's true, but unnecessarily costly for both parties. Workers lost six weeks' wages and the company lost most of the new business it had worked so hard to build up.

All contents of this feature are copyrighted, November 1961, by FACTORY and McGraw-Hill Publishing Company, Inc., N. Y.

ASD

A NEW CONCEPT IN LIFT TRUCKS THAT HELPS YOU CUT COSTS

Take a complete line of lift trucks. Simplify components. Make them more reliable, more accessible. Use the same components in as many models as possible. Combine controls into fewer levers or handles. Add the newest thinking in steering, hydraulics, driver comfort, safety.

The result is ASD—Advanced Simplified Design—an AUTOMATIC program of complete redevelopment and refinement of lift trucks. It is a program of design simplification that only a company with AUTOMATIC's depth of engineering talent could undertake. AUTOMATIC's crisp, clean 1962 design is unprecedented in the industry. ASD improves lift truck performance, increases accessibility for maintenance, cuts operating costs, and makes driving easier, safer. It means less down time so that the trucks can spend more time on the job, and move more tons of material.

ASD is already a reality with new models just introduced by AUTOMATIC. And these are just the beginning. More trucks with ASD are on the way to help you move goods more efficiently at lower cost. Ask your AUTOMATIC dealer for the details, or write direct.

see ASD in action . . . next four pages

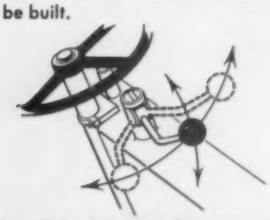
AUTOMATIC®

A Division of The Yale & Towne Manufacturing Company

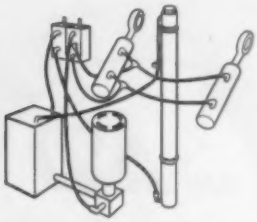
39 W. 87th St., Dept. W1, Chicago 20, Illinois

*ASD** BRINGS LOW OPERATING COST AND TOP PERFORMANCE TO THE MODEL ERS

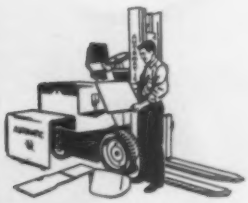
Silicone-insulated electric motor — Motor is built by AUTOMATIC especially for lift truck use. Silicone insulation withstands high operating temperatures caused by heavy-duty work cycles, prevents burn-outs and expensive repairs. Motor meets Class H specifications, the highest standard to which electric motors can be built.



Simplified controls — Lift and tilt controls are combined in one handle for easier, faster control of forks. Controls can be operated simultaneously or independently. Truck is also equipped with exclusive AUTOMATIC Current Miser Control which reduces current consumption during maneuvering operations.



Simplified hydraulics—Compact, simple design and short lengths of hose make hydraulic system easy to check and maintain.



Easy servicing — Easily removed covers expose all parts for servicing, simplify maintenance and battery checks.

NEW HEAVY-DUTY ELECTRIC DOES MORE WORK PER BATTERY CHARGE

Thanks to *Advanced Simplified Design, this new Model ERS electric truck delivers big truck performance in spite of its extremely compact size. The truck is available in capacities of 3,000 and 4,000 lbs., and is the only unit in this class that can accept a standard 18 cell, 21-plate battery without increasing the truck dimensions.

AUTOMATIC's unique Current Miser Control system provides added torque in low speeds, and saves as much as 60% of the battery power during maneuvering operations. This means more power for heavy-duty handling, less down-time for battery charges, longer work cycles, and more tons handled per battery charge.

The Model ERS also features fast travel (7.0 mph light), and high speed lifts (80 fpm standard, 140 fpm as an extra with 36 v. battery) for top efficiency on high production assignments. For additional details, call your nearby AUTOMATIC dealer or send coupon for literature.

Only AUTOMATIC trucks have *Advanced Simplified Design

AUTOMATIC®

A Division of The Yale & Towne Manufacturing Company

39 West 87th Street, Dept. W1, Chicago 20, Illinois

Please send specifications on Model ERS Battery-Powered Lift Truck.

Name_____ Title_____

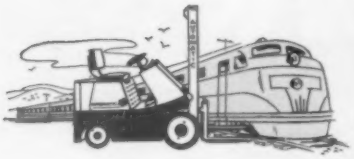
Company_____

Street_____

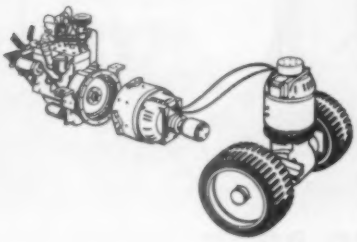
City_____ Zone____ State_____

For more facts Circle 421 on Reader Service Card

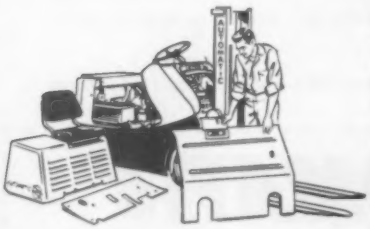
HERE'S HOW *ASD** MAKES THE MODEL GLF MORE ECONOMICAL, EASIER TO SERVICE



Electric drive efficiency — Since there is no direct coupling between engine and drive axle, engine speed is not dependent on truck speed. This means torque can be varied by the requirements of the load and that the engine can operate at its most efficient speed at all times. This efficiency has been proven in railroad use with the result that almost every locomotive in operation today is powered by a Diesel-electric unit.



Simplified power train—Engine plus variable voltage generator (one moving part) connected by two wires to electric drive motor (one moving part) equal *Advanced Simplified Design. This completely job-proven drive, as standard equipment on the GLF Series trucks, senses the power needs and automatically adjusts to varying torque and speed requirements. There are no shifting gears, no friction clutches, no slushing oil, no valving or piping—virtually nothing to wear out or cause trouble so common to other types of automatic transmissions.



Easy maintenance—All parts are easily accessible for maintenance by removing three pieces of shrouding—engine cover, floor board, and front cowling. Hydraulic pump can be removed by disconnecting two hydraulic fittings and unscrewing two bolts. Brakes can be adjusted without removing the wheels.

GAS-POWERED TRUCK WITH HIGH-EFFICIENCY TRANSMISSION

cuts fuel costs as much as 30%

There's a big difference in gas-powered trucks . . . and the AUTOMATIC Model GLF has the difference that makes real savings in fuel costs and maintenance expenses.

Actual field tests have shown the Model GLF's exclusive electric drive delivers gas savings up to 30%, compared to other types of automatic transmissions. The Model GLF is available in capacities of 3,000 through 10,000 lbs. with cushion tires; 3,000 through 8,000 lbs. with pneumatic tires. Choice of gas or LPG.

This is one more example of how AUTOMATIC has engineered lift trucks with *Advanced Simplified Design to give you more dependable, more economical trucks for the money. It's another reason why it pays to contact your nearby AUTOMATIC dealer when you need lift trucks. Call him . . . or mail coupon for full details on the Model GLF series.

Only AUTOMATIC trucks have *Advanced Simplified Design

AUTOMATIC®

A Division of The Yale & Towne Manufacturing Company

39 West 87th Street, Dept. W1, Chicago 20, Illinois

Please send Facts and Factors Brochure on Model GLF gas-powered lift trucks.

Name_____ Title_____

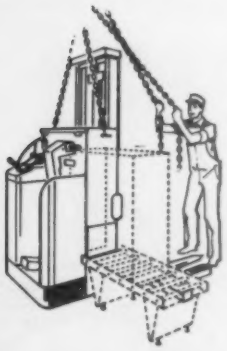
Company_____

Street_____

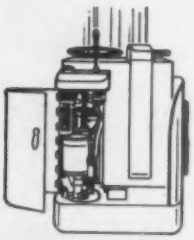
City_____ Zone_____ State_____

For more facts Circle 422 on Reader Service Card

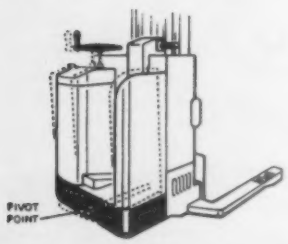
HERE'S HOW *ASD** MAKES THE MODEL VST EASIER TO DRIVE AND SERVICE



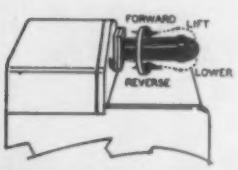
Battery removal top or side. Battery can be rolled out from either side. Steering wheel and Quadtrol controller swing back to allow overhead removal or servicing.



Accessibility of parts simplifies servicing. Rear cover swings out to put drive motor, electrical components, and brake within easy reach for servicing.



Knee action frame assures stability under all conditions. Straddle arm section pivots independently of drive unit section, preventing frame distortion, lack of traction, and instability on uneven floors.



Quadtrol control handle combines speed and lift controls in one unit for easier driving. One handle controls three speeds forward and reverse, plus lifting and lowering of the forks.

IT'S SO EASY TO DRIVE, NARROW AISLES SEEM WIDER

*Advanced Simplified Design has made this new AUTOMATIC Model VST a real performer in narrow aisles. It is not only extremely compact and maneuverable, but its simplified controls permit faster, safer driving. Aisles actually seem wider with the Model VST on the job. Result: More goods handled in space-saving narrow aisle warehouses and other cramped storage areas.

Thanks also to Advanced Simplified Design, maintenance is easier and requires less time. The truck stays on the job longer and moves maximum tonnage. The Model VST is available in capacities of 2,000, 3,000 and 4,000 lbs. Get the full details. Ask your AUTOMATIC dealer, or send coupon for Model VST literature.

Only AUTOMATIC trucks have *Advanced Simplified Design

AUTOMATIC®

A Division of The Yale & Towne Manufacturing Company

39 West 87th Street, Dept. W1, Chicago 20, Illinois

Please send Specification Sheet on Model VST narrow aisle truck.

Name_____ Title_____

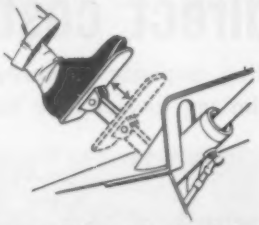
Company_____

Street_____

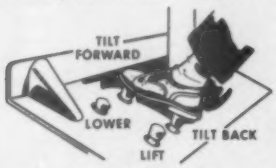
City_____ Zone____ State_____

For more facts Circle 423 on Reader Service Card

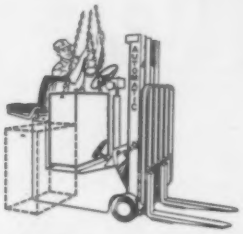
HERE'S HOW *ASD** PUTS THE MODEL RST AT THE TOP OF ITS CLASS



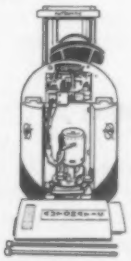
One pedal works both brake and accelerator — Driving this truck is a snap with its simplified controls. Operator pushes down on foot pedal to increase speed, lets pedal up to coast or apply brake. One easy motion of operator's foot accelerates or slows truck in a smooth, fully controlled manner.



Foot-controlled lift and tilt This ASD* feature keeps operator's hands free for steering truck, makes possible faster handling because operator can easily perform two functions at once. Lift and tilt cylinders are controlled by throttle-type valves which give smooth movement of forks and mast.



Easy battery removal — Battery is completely exposed for checking or replacement. Seat hinges back to give full access to battery for either side or overhead removal.



Easy maintenance — Two special hinged covers at the rear of the truck open to expose drive motor and electric controls for servicing. Drive motor and many major component parts are interchangeable with other AUTOMATIC trucks, increasing parts availability and simplifying servicing.

NEW COMPACT ELECTRIC RIDER SPEEDS HANDLING IN TIGHT SPOTS

Here's a new counterbalanced truck with *Advanced Simplified Design that speeds handling of goods in narrow aisles, trailer trucks, and on crowded docks. The model RST is ideally suited for warehouse operations, light industry, and retail supermarket handling. Compact design, short turning radius, and good weight distribution make an outstanding unit for working inside trailer trucks or in buildings where space is a premium. Has extra fast travel and lift speeds for greater efficiency. Three capacities: 2,000, 2,500 and 3,000 lbs. Even the price is compact! Get the details—call your nearby AUTOMATIC dealer or mail coupon for literature.

Only AUTOMATIC trucks have *Advanced Simplified Design

AUTOMATIC®

A Division of The Yale & Towne Manufacturing Company

39 West 87th Street, Dept. W1, Chicago 20, Illinois

Please send specifications on new compact electric truck, Model RST.

Name_____ Title_____

Company_____

Street_____

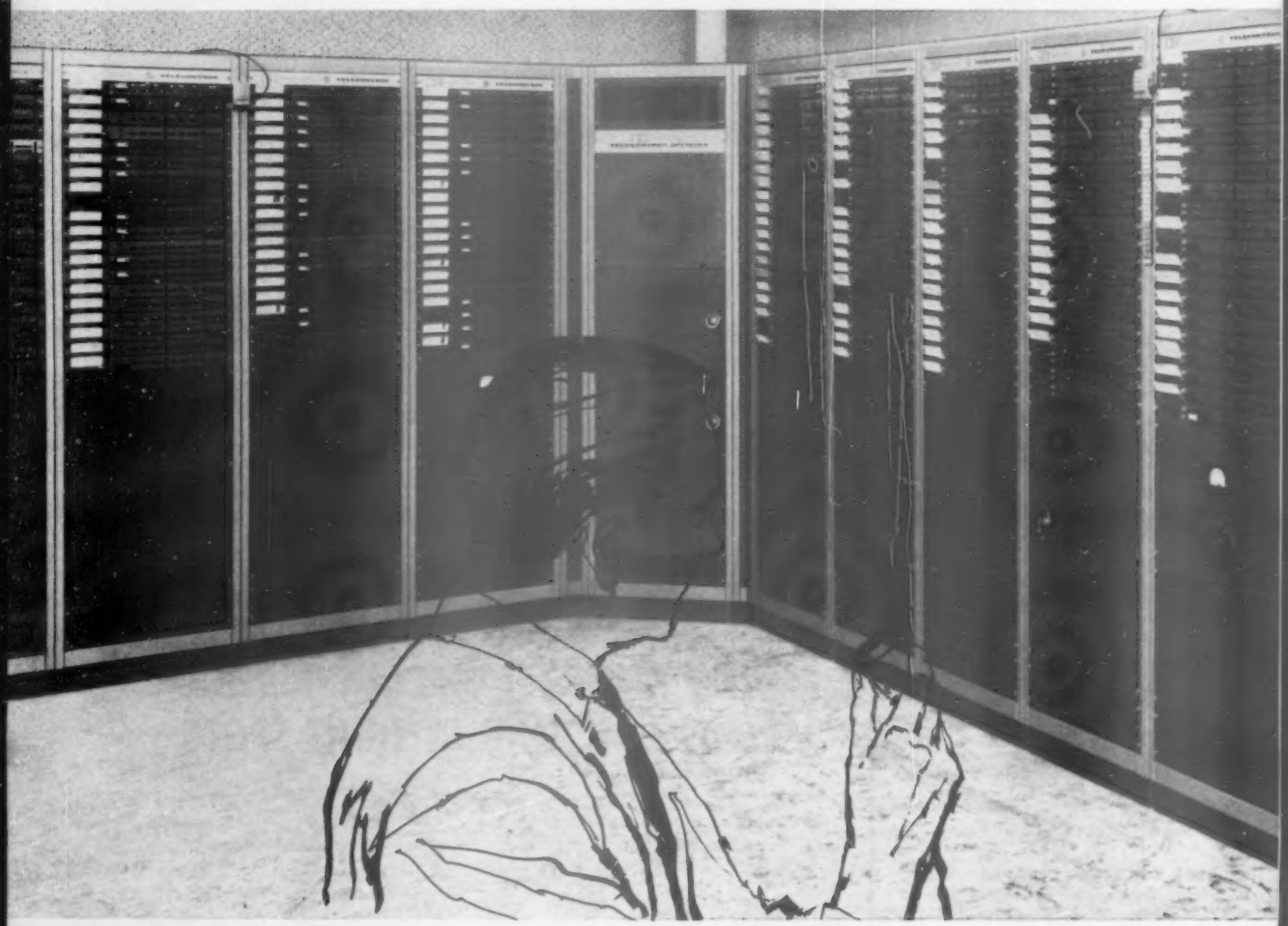
City_____ Zone_____ State_____

For more facts circle 424 on Reader Service Card

TELECONTROL

command post for the attack on indirect costs

speeds supervisory action --- lowers downtime costs --- reduces material-handling expense --- improves scheduling efficiency --- cuts inventory costs --- mechanizes record keeping --- minimizes tool-change time



how Telecontrol coordinates supervision with production requirements . . . Following installation of Telecontrol, the vital activities of supervisors, foremen, stock chasers, tool setters, fork-truck drivers, crane operators and other service personnel become coordinated. With Telecontrol, the efforts of these people are effectively directed to meet the needs of operators at production stations. No longer do supervisory personnel spend much of their time looking for each other, trying to find trouble spots and sifting through mountains of paper.

Telecontrol gathers production data from all work stations and displays it in a central control room. One man—the control-room dispatcher—has a constantly-changing, complete picture of the status of every machine in the plant.

What machines are operating? How many more parts are needed to complete the production run? What operator is on that special job? Is downtime being held to a minimum? These are questions that Telecontrol answers for the dispatcher minute-by-minute every day.

Telecontrol also incorporates an in-plant communications system so the dispatcher can take quick, directive action based on the information available to him. From this Command Post, the dispatcher anticipates stock or job run-out, helps schedule tool set-up and maintenance, assures correct production scheduling, and directs foremen and service personnel to trouble areas.

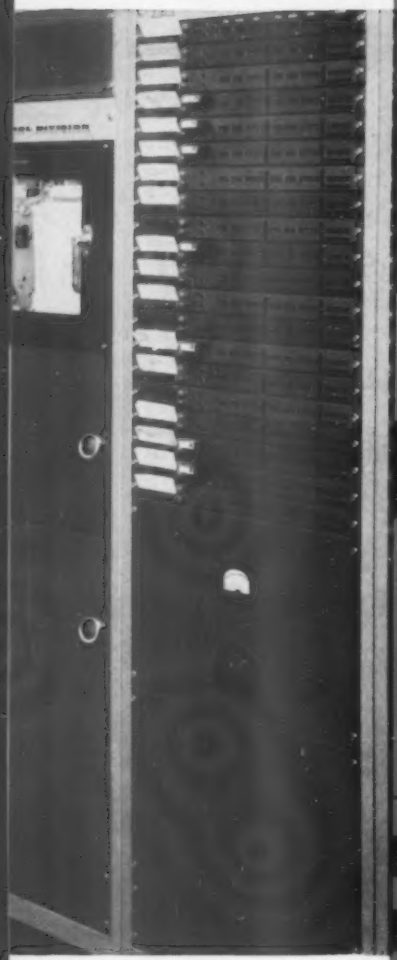
simplicity of Telecontrol's operation . . . Each Telecontrol work station is tied to the control room by an electrical cable. Production time, downtime, units produced, and balance of run, are continuously summarized and displayed on individual panels in the control room, for each machine. A green light . . . on the machine-control box and its corresponding control panel . . . indicates the machine is operating and the counters are recording. A red light . . . in both locations . . . indicates a machine operator has signaled a request for assistance.

The dispatcher uses Telecontrol for maintenance of production. The accounting department uses the data produced, for costing purposes. The same data, converted to punched cards and automatically processed, gives management information on which to base longer-range plans.

For more facts Circle 425 on Reader Service Card

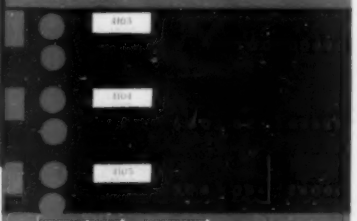
ELEMENTS OF TELECONTROL

operator can get help when he needs it. No delays, no looking for the foreman. He just flips an alarm switch mounted right at his work station.

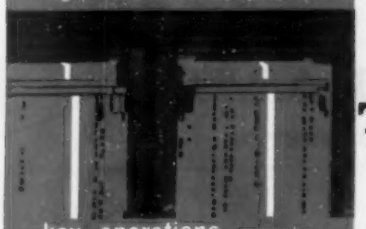


dispatcher sees red light and/or hears signal in central control room. He uses plant P-A system to direct foreman or other required assistance to machine in trouble.

foreman . . . who has been relieved of most of his former paperwork load . . . is on the floor doing his real job. He gets to the trouble spot in seconds, decides what is needed and can phone dispatcher to take appropriate action.



control panel counters automatically keep track of and summarize such vital information as productive time, downtime, units produced, and balance of run. Dispatcher can anticipate stock needs, and these panels automatically signal when an order is finished. This permits rapid re-assignment of operator, quick retooling of machine for next job, etc.



key operations recorder charts the usage of selected high-cost or critical machines.

SOME TELECONTROL ADVANTAGES

- continuously accumulates accurate production data at one central control point
- reduces footwork and paperwork for foremen, stock chasers, material handlers and others
- permits more efficient order handling and expediting
- anticipates production problems and points ways to solutions
- eliminates overruns and resultant 'scrap'
- assures optimum use of men, materials and machines
- reduces work-in-process inventory

TYPICAL TELECONTROL APPLICATIONS

SCREW MACHINES	AUTOMATIC WELDERS
TURRET LATHES	DRILL PRESSES
ROTARY PRINTING PRESSES	BROACHING MACHINES
DIE CASTING	HEADERS
INJECTION MOLDING	SEWING MACHINES
PUNCH PRESSES	PIPE OR BAR EXTRUDERS
GRINDERS	ASSEMBLY-LINE CONVEYORS
TEXTILE LOOMS	TIRE MOLDING

TYPICAL CUSTOMERS

WESTINGHOUSE	GENERAL MOTORS
J. I. CASE	DOEHLER-JARVIS
FORD	NORGE
MAYTAG	A. O. SMITH
BAUSCH & LOMB	THE TUPPER COMPANY
REYNOLDS METALS	BENDIX
CUTLER-HAMMER	TECUMSEH PRODUCTS
WHIRLPOOL	SUNBEAM
CORNING GLASS	HOOVER BALL BEARING
CHRYSLER	KELSEY-HAYES
CLARK EQUIPMENT	LAMSON & SESSIONS
SHWAYDER BROTHERS	DANA CORPORATION

what Telecontrol could do for your plant—

Large or small and whatever you process, odds are that Telecontrol will result in great economies in your Attack on Indirect Costs. A phone call, wire or letter will bring full information or a personal visit from a sales representative specializing in manufacturing-control problems.

TELECONTROL®

HANCOCK TELECONTROL CORPORATION

key to the total systems approach to manufacturing management

320 Park Avenue, New York 22, N. Y.
PLaza 2-5630

Four ... not three. The United of Standards

Champion is one of ... and has more than

Specializing in industrial Champion into retail

Our prices reflect the compare our on any of

For details, contact Champion distributors or .

Lamp Specialists Since 1900

CHAMPION LAMPS

LYNNWAY, LYNN, MASSACHUSETTS
LYnn 3-2000

CHAMPION LAMPS

FACTORY

. . lamp lines carry
States Bureau
quality approval.

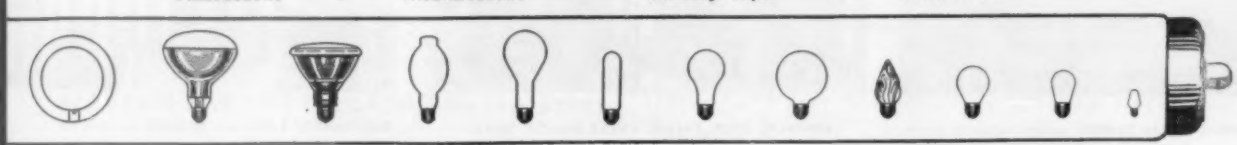
these approved lines
been for
twenty-five years.

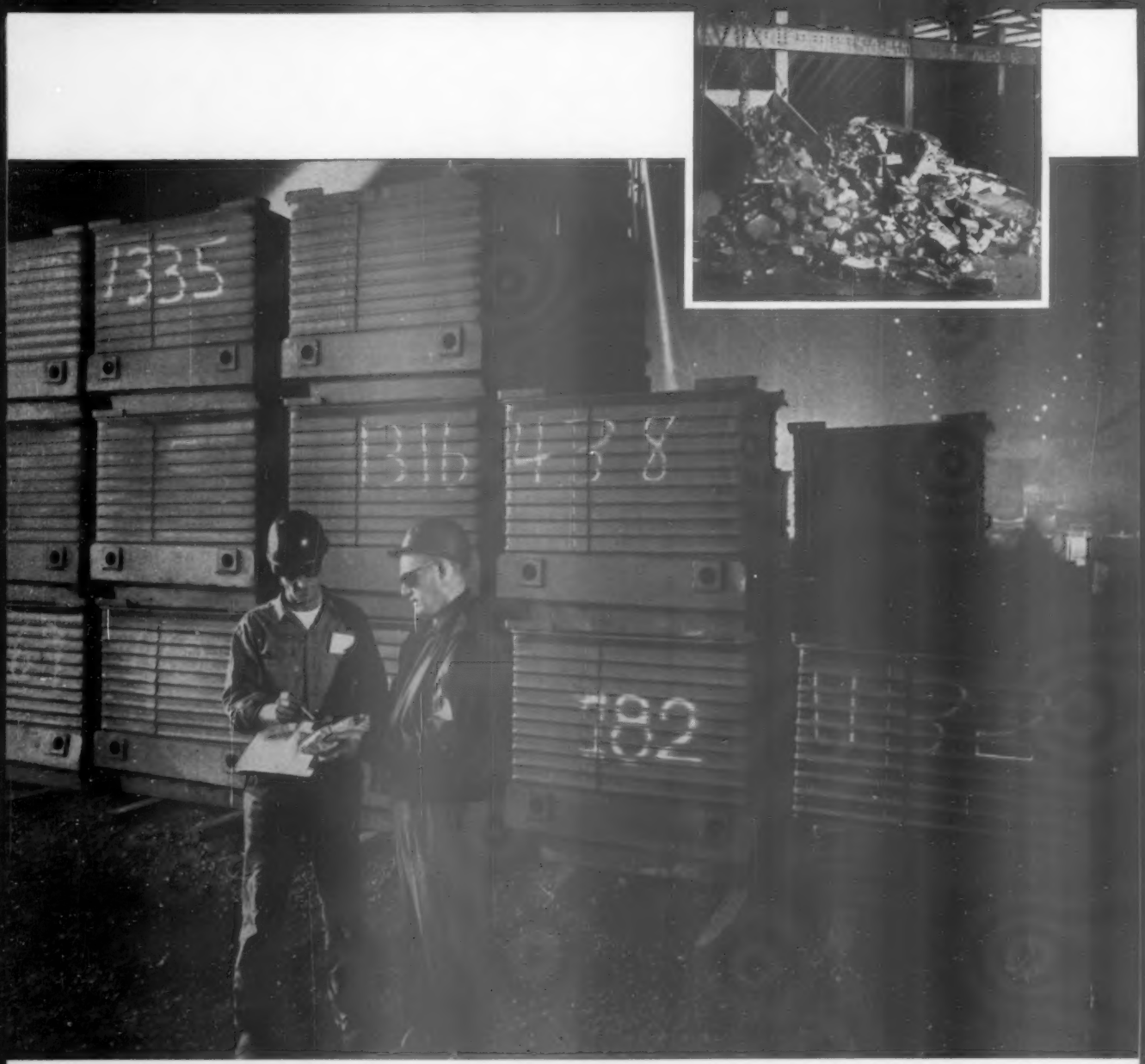
and commercial lighting,
does not have to pour millions
lamp and appliance merchandising.

saving. It will pay you to
discounts with those you are getting
the other three approved brands.

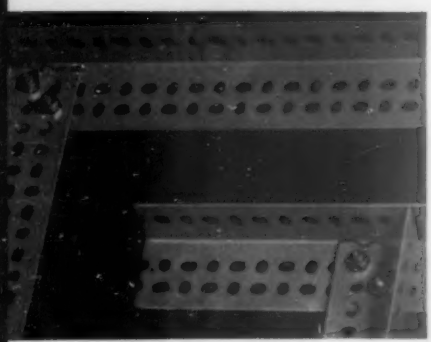
. . Mr. Bill Ferris at our Lynn plant.

Fluorescent • Incandescent • Mercury Vapor • Infra-Red





Comparison of the new with the old at Tennessee Products leaves little doubt as to improvements resulting from adoption of Republic Drop Bottom Boxes. Storage of material in boxes makes most effective use of space, permits holding larger shippable inventory, prevents contamination.



REPUBLIC METAL LUMBER solves storage problems, too. Makes racks, shelves, brackets, framework in exact size and arrangement needed. Measure and cut like common lumber, assemble with standard bolts and nuts. Send coupon for idea booklet.

REPUBLIC STEEL PALLET RACKS handle bulky, odd-size, and fragile materials. Tubular steel supports adjust at six inch levels. Two-way entry permits loading and unloading from either side, makes palletizing easy and practical. Coupon will bring complete description.

ELECTRUNITE® E.M.T. can provide savings for you. "INCH-MARKS"® assure easy, accurate cutting; full-length "GUIDE-LINES"® help you get true, wrinkle-free bends. Specify Republic ELECTRUNITE E.M.T. You'll find that *The Best Costs Less Installed.*

Circle 427 for Drop Bottom Boxes, 428 for Metal Lumber, 429 for Pallet Racks, 430 for Metallic Tubing

At Tennessee Products and Chemical Corporation

20% SAVED IN PLANT HANDLING COSTS ... CARS LOADED 30% FASTER

With Republic Drop Bottom Boxes

There's a familiar philosophy in material handling; "to save on product handling costs—don't handle it!"

Tennessee Products and Chemical Corporation recently put this theory into practice with the purchase of 2,250 Republic Drop Bottom Boxes for their ferroalloys plant in Rockwood, Tennessee. A startling transformation in the entire material handling system was the immediate result.

Formerly, ferroalloys were hand or scoop loaded at every step in their movement through the plant. Inventory, held in loose stockpiles, wasted floor space and was easily contaminated. Frequently, movement of material was delayed because needed cranes were busy elsewhere.

Now, after removal from the molds, ferroalloys are loaded into Republic Drop Bottom Boxes . . . each coded according to contents . . . and moved by fork truck for storage in the same boxes, or to crushers for processing. Boxes of material to be shipped also are carried by fork trucks, for fast drop bottom emptying into box cars. At no time is material hand shoveled or handled in any way except in Republic Drop Bottom Boxes.

A review of improvements noted by TP & CC management since the boxes were put in use shows that handling and loading have been simplified and made safer throughout the plant. Inventory is more easily controlled, containerization and stacking permits carrying larger shippable inventories, and contamination is eliminated.

If material handling is costing you too much—even if you only suspect that it is—get Republic Material Handling Engineers on the job. Profitable solutions can be found for you, too! Call, or mail the coupon.

Strong
Modern
Dependable

Hours of costly hand shoveling are saved by easy fork truck movement of material in the same Republic Drop Bottom Boxes through every step of production. Fast truck handling and fast emptying of boxes saves as much as 30% in loading time for shipment.

REPUBLIC STEEL

REPUBLIC HAS THE FEEL FOR MODERN STEEL

REPUBLIC STEEL CORPORATION
DEPT. FA-2559-A
1441 REPUBLIC BUILDING · CLEVELAND 1, OHIO

Please send more information on the following:

☐ Republic Drop Bottom Boxes ☐ Republic Steel Pallet Racks
☐ Republic METAL LUMBER® ☐ Republic ELECTRUNITE E.M.T.

Name_____ Title_____

Firm_____

Address_____

City_____ Zone____ State_____

Get more efficient use of costly space! The Yale K-58 gets in and out of the tightest quarters with new ease and efficiency. Lets you rearrange storage areas . . . save costly square and cubic footage now wasted by excessively wide aisles required by older, bulkier equipment. High hydraulic efficiency gives you faster lifting geared to tighter operating schedules. Standard or low silhouette design offers a selection of masts to meet all stacking requirements.

Move right in where clearance is low. The K-58 is ideal for loading operations. Low silhouette protects the operator from bumping his head. Lets you eliminate costly delays, excessive handling on platforms and cramped areas in plant and warehouse. Operator comfort is assured with four inch fore-and-aft adjustable safety seat. Power cut off and heavy-duty brakes applied instantly when operator leaves seat. Articulated steering axle gives wheels proper ground contact over uneven surfaces.

It's time to meet the

As costs rise on every side, you pay a higher and higher price for waste space, waste time, labor, excessive maintenance . . . created by an obsolete materials handling program. You can be sure your competition is moving to eliminate losses in these areas and protect their profits by taking advantage of new materials handling equipment and methods. The Yale K-58 Electric Truck will help you meet this challenge, too.

ep up efficiency with the right attachment. The le electric truck line has been engineered to operate with a mplete selection of highly versatile attachments to meet specific o requirements. The hydraulic clamp above, for example, ovides fast palletless handling; with simple adjustment con- ts to normal fork operation for pallet loads as above, right. oice of three I-beam masts including the Triplex for stacking to 201 inches without increasing overall truck height.

Get faster, smoother handling. The Yale simplified mechanically actuated carbon pile speed control provides an infinite speed range for smooth acceleration . . . for more efficient truck control, travel, safer handling of loads. Operators work more efficiently, take to K-58 eagerly. Yale K-58 trucks also use the most economical form of power . . . electricity. You eliminate possible contamination from fumes, odors . . . especially around foods. Write for full information on K-58 savings, today.

challenge of rising costs!

he short, compact Yale K-58 has a 8-inch turning radius . . . lets opera- ors maneuver effortlessly into the nar- owest aisles. Faster travel speeds and aster lift step up the number of loads andled . . . cut labor costs. Mechan- ally actuated carbon pile control gives perators a new precision in inching oads into position . . . cuts load damage. And rugged Yale design cuts mainte- ance costs, gives new truck perform- nce for the life of the truck!

Check the details presented with the illustrations above. Then—check the hidden costs you may be paying with equipment that can't deliver . . . and start your savings now.

One of Yale's flexible leasing or finance plans can put a K-58 Electric Lift Truck to work for you immediately. Contact your Yale Representative, or write:

Yale Materials Handling Division, Dept. K-105, Philadelphia 15, Pa. A Division of The Yale & Towne Manufacturing Company.

YALE®
INDUSTRIAL LIFT TRUCKS
TRACTOR SHOVELS • HOISTS
YALE & TOWNE

For more facts Circle 431 on Reader Service Card

SECURITY
A Pinkerton Guard Force in an industrial installation is just as much on its toes after a year on the job as the first day. Only Pinkerton's can offer you this quality of service, because only Pinkerton's has the necessary supervisory setup. Supervision is a key feature of Pinkerton's service. For further information send for our Security Brochure.
WARNI
PROTECTED
PINKERT

PINKERTON'S NATIONAL DETECTIVE AGENCY, INC.

PINKERTON'S OF CANADA LIMITED

100 Church Street, New York 7, N.Y. **47 offices from coast to coast**

Find It Fast In The Yellow Pages

For more facts Circle 432 on Reader Service Card

Circle 433 on Reader Service Card for items on next page

hoover quality bearings

. . . HARDLY A WHISPER

Nuclear submarines like the SKIPJACK are designed to carry out underwater missions in utmost silence. That is why the hushed quietness of *Hoover Quality* ball bearings makes them ideal for critical applications on this and many other types of equipment.

Hushed quietness in a bearing is a promise of excellent quality, superior performance and long life.

And it's no coincidence that Hoover bearings are exceptionally quiet. *Hoover Honed* bearing raceways are super smooth, superbly finished. *Micro-Velvet* balls are spherically accurate within millionths of an inch and surface finished to microscopic perfection. These precision components work together in perfect harmony. We, at Hoover, know because every *Hoover Quality* bearing is checked electronically before it is shipped.

Hoover Honed and Micro-Velvet are Hoover Trademarks

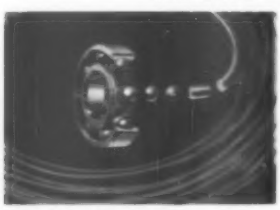
hoover

BALL AND BEARING COMPANY

5400 South State Road, Ann Arbor, Michigan

Zone Sales Offices and Warehouses | 8581 South Chicago Ave., Chicago 17, Illinois
290 Lodi Street, Hackensack, New Jersey
2020 South Figueroa, Los Angeles 7, California

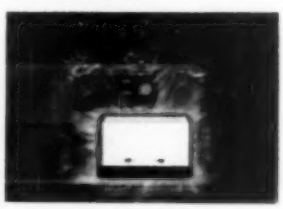
hoover CONTROLS *hoover quality* FROM START TO FINISH



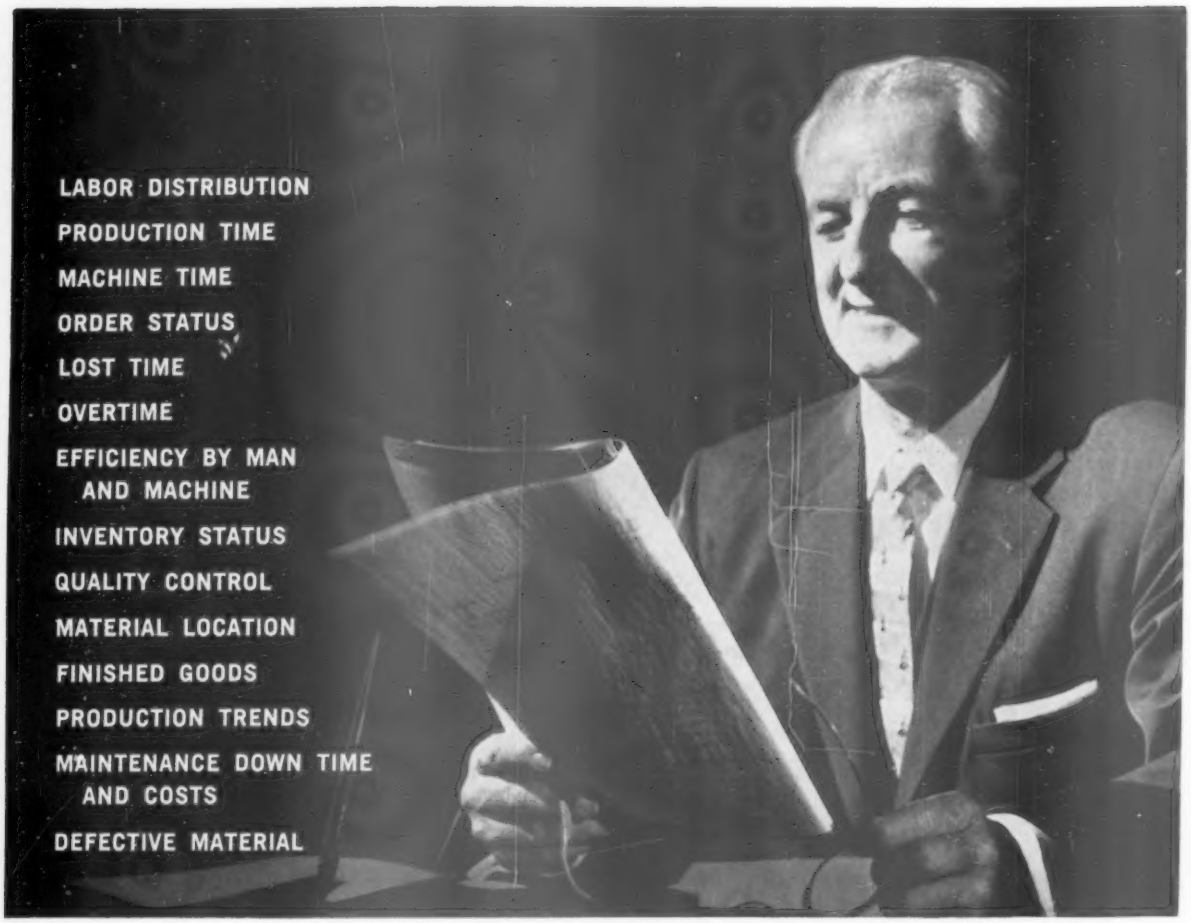
High quality wire from which balls are made is produced by Hoover's Cuyahoga Steel and Wire Division.

Hoover *Micro-Velvet* Balls are made of the finest of chrome alloy steel. Sphericity is measured in millionths of an inch.

It's easier to strike a match on plate glass than on the smooth finish of a *Hoover Honed* bearing raceway.



Hoover quality control methods include non-destructive electronic inspection of bearing components.



How many of these facts are you NOT getting?

Use a Stanrecorder to record *all* the source data that originate in your production departments and you've taken the first step toward *completely automatic* control over labor distribution and production operations.

Listed above are the types of facts that Standard Register's Stanrecorder can collect and record for you—quickly, accurately, and at low cost.

The Stanrecorder gathers all source data on one form—time, man, operation, location, variables, production counts, and order identity. Furthermore, the data are gathered so systematically that subsequent processing can be completely automated, all the way through your accounting system. And still another feature, you obtain a complete audit trail because data are originally entered in exact chronological order on a continuous Standard Register form.

Take the first step toward better business controls. Have the Standard Register representative explain the remarkable new way to record total source data on one form, using the Stanrecorder.

STANDARD REGISTER STANOMATIC SYSTEMS

Business Forms and Forms Handling Equipment for Paperwork Simplification

THE STANDARD REGISTER COMPANY, DAYTON 1, OHIO

For more facts Circle No. 434 on Reader Service Card

This Patented

CLIP and STUD

makes LYON your BEST SHELVING INVESTMENT

Design makes the difference! Don't settle for less than the exclusive Lyon CLIP and STUD which many have tried to copy but none can duplicate. Fully protected by Government patents, Lyon CLIP and STUD obsoletes conventional steel shelving and guarantees you these *extra dividends*—

- ★ Easy, fast, low cost assembly.
- ★ Complete flexibility—shelves instantly adjustable from the front without use of nuts, bolts or tools.
- ★ Tremendous structural strength and rigidity.

Another extra dividend from Lyon—oldest and leading steel shelving manufacturer—an experienced Lyon Storage Engineer and Lyon Dealer as near as your phone—ready to help you save space, time, money.

Factories in Aurora, Ill.—York, Pa.—Los Angeles

There is a type of Lyon Shelving for every application—open, closed, bin, counter, sliding shelf, tool, mezzanine. Above—a typical tool room installation.

LYON METAL PRODUCTS ®

OVER 1500 ITEMS

For Business, Industry and Institutions

MAIL COUPON FOR THE 100-PAGE CATALOG

LYON METAL PRODUCTS, INC.
1112 Monroe Avenue, Aurora, Illinois

☐ I would like to see a Lyon CLIP and STUD demonstration.

☐ I'd like a copy of your 100-page Catalog which tells the complete shelving story and covers entire line of products.

NAME_____

FIRM_____

ADDRESS_____

CITY_____ ZONE____ STATE_____

A PARTIAL LIST OF LYON PRODUCTS

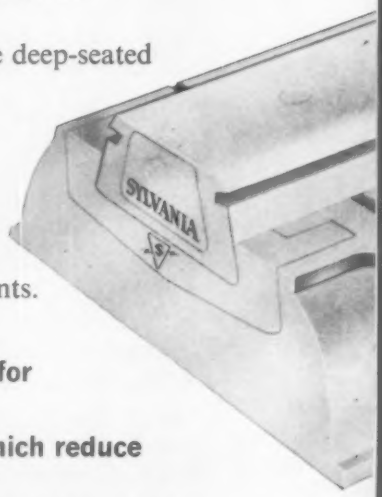
• Desks	• Storage Cabinets	• Bookcases	• Folding Chairs	• Sorting Files	• Tool Stands	• Cabinet Benches	• Display Equipment
• Tables	• Flat Drawer Files	• Coat Racks	• Service Carts	• Hopper Bins	• Tool Boxes	• Revolving Bins	• Hanging Cabinets
• Stools	• Drawing Tables	• Shelving	• Work Benches	• Drawer Units	• Parts Cases	• Toolroom Equip.	• Slotted Angle
• Lockers	• Filing Cabinets	• Bin Units	• Bench Drawers	• Shop Boxes	• Bar Racks	• Service Counters	• Wood Working Benches

Attack Indirect Costs with
The Ideal Answer to Your Industrial Lighting Problems...Sylvania's Ne

Here is a totally-new series of industrial lighting fixtures designed to make your lighting fixture selection simple and positive.

Sylvania's Power-V Series includes *all of the features you want* in industrial lighting equipment—ruggedness, versatility, adaptability, ease of installation and maintenance, trimness, simplicity, high efficiency, excellent lighting characteristics . . . and all at competitive prices.

This is a completely modern fixture series from the deep-seated channel design to the wide, rugged embossed reflector.



The Power-V Series is designed to provide the high level, quality lighting job you need to increase production and efficiency and to decrease rejects and accidents. Because of the wide choice of models and lamp types, you can practically custom-design a lighting system to fit your exact illumination requirements.

Each Power-V model features:

- **Reflectors with deep embossments and ribbing for strength and rigidity.**
- **Simplicity of design and labor-saving devices which reduce installation and maintenance time.**
- **Excellent lighting characteristics with 430 ma Rapid Start and Instant Start; 800 ma Rapid Start; or any size of the powerful 1500 ma Rapid Start lamps.**
- **A low silhouette to provide neat, trim appearance.**

From every angle, we believe the Power-V Series to be the finest line of industrial lighting fixtures ever produced. May we send you the details? Just write to:

SYLVANIA LIGHTING PRODUCTS
A Division of SYLVANIA ELECTRIC PRODUCTS INC.
One 48th Street, Wheeling, West Virginia

For New Construction or Industrial Modernization...
Be Sure to Investigate Sylvania's **Power-V** *Series*

Power-V Series

POWERFUL

Recommended footcandle levels are reached easily with Power-V . . . and you maintain quality standards, too. Designed to use 430 ma, 800 ma or all types of 1500 ma lamps.

RUGGED

Strong, rigid fixtures featuring double-V embossments on reflector. Withstands rough handling or accidental bumps and abuse.

NEAT

Trim, shallow appearance assured through positive integration of channel and reflector. Low silhouette enhances any installation.

SIMPLE

Clean design, minimum parts, labor-saving devices add up to simplicity of installation and maintenance.

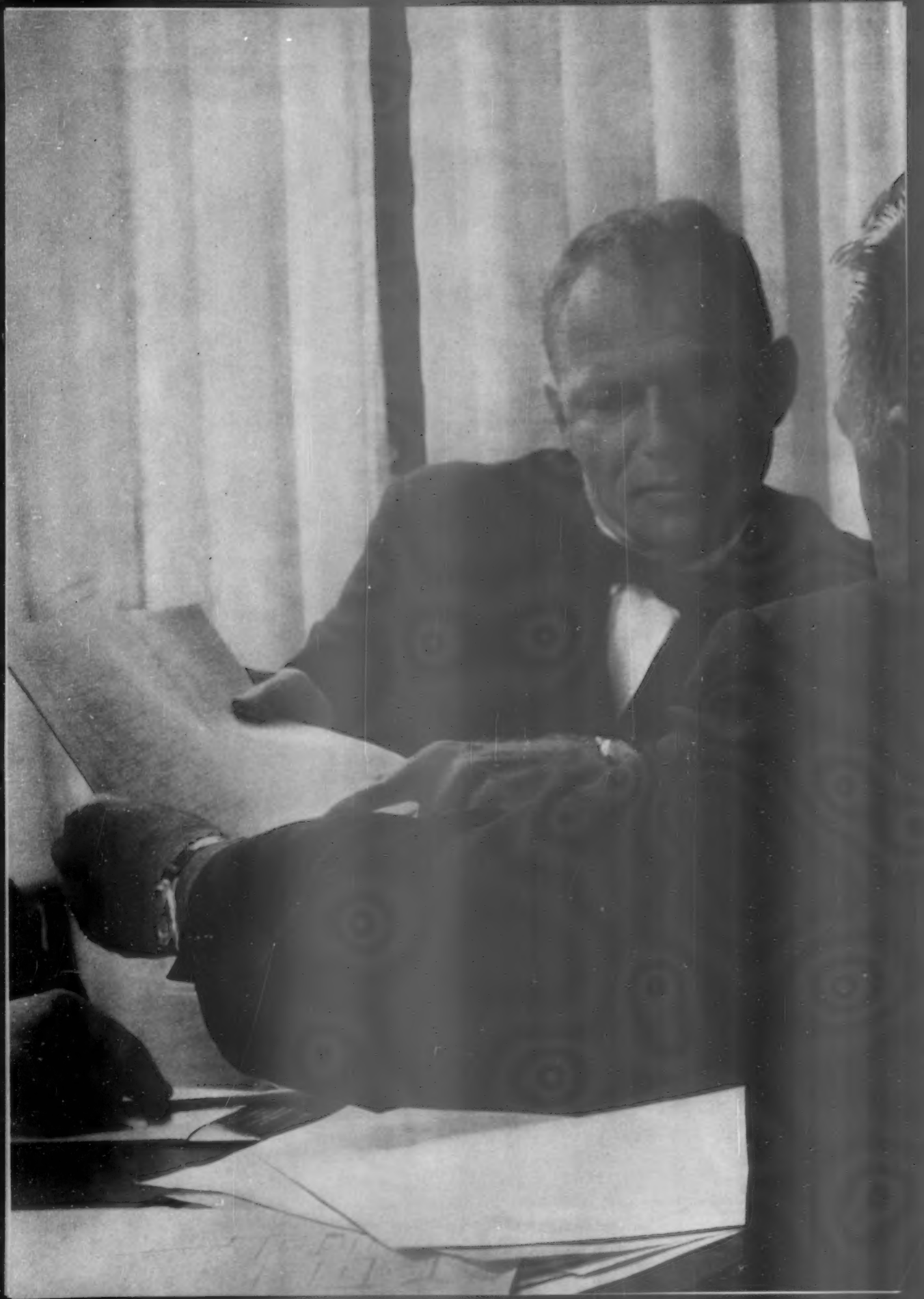
LIGHTING FIXTURES BY

SYLVANIA

SUBSIDIARY OF

GENERAL TELEPHONE & ELECTRONICS

GENERAL TELEPHONE SYSTEM



"Bob, the computer analysis says we should buy those parts instead of making them"

NEW CAPITAL INVESTMENT PROGRAM

Here's a new IBM computer program that's yours for the asking. Using the Investors Method (Rate of Return on Investment), it helps you evaluate—*quickly, economically, uniformly*—alternate proposals for spending your company's money.

The program will help you solve problems like these: should you buy a new piece of equipment or keep the old one in repair; should you increase your manufacturing facilities; should you buy or make certain products; how should you spend your money for research to make the most profit?

These are only a few of the problems that the Capital Investment Program handles. All it takes is the Program and an IBM computer that accepts FORTRAN programming language. The low cost IBM 1620 Data Processing System is one such computer.

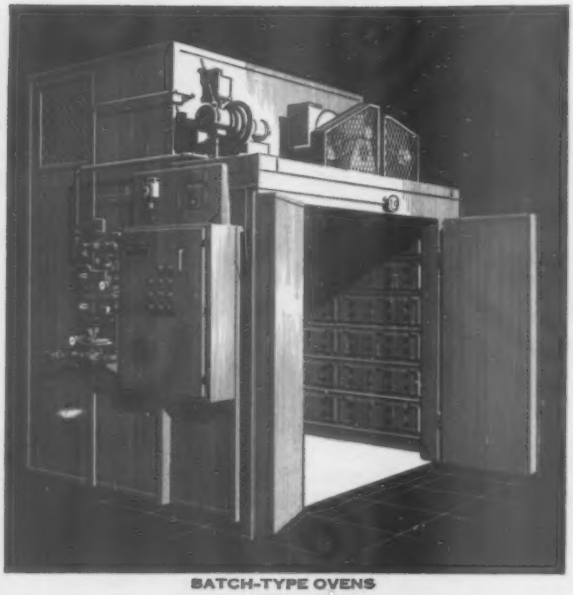
The new Capital Investment Program is another of the many problem solving programs IBM offers you to help make your data processing system a more effective and more profitable tool for managing your business.

Your local IBM Representative can give you complete details on this, as well as previously announced programs, which included Sales Forecasting, Materials Planning, Inventory Management, Plant Scheduling, Work Dispatching, Operations Evaluation, Inventory Management Simulation, and many others.

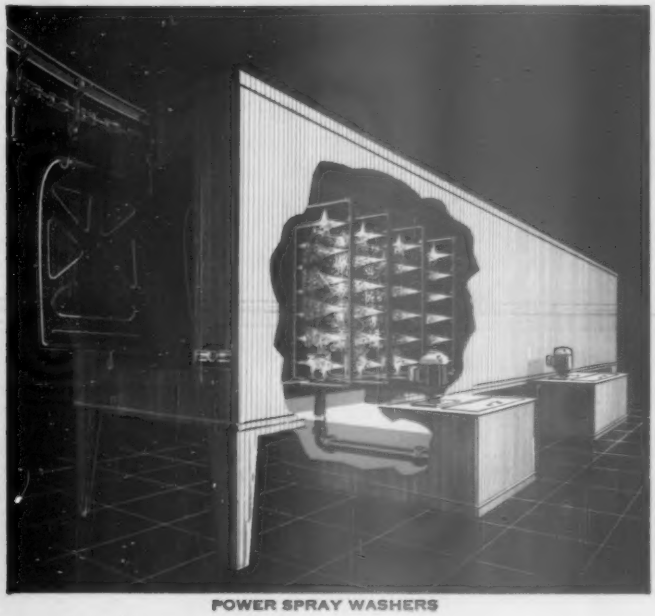
IBM®
DATA PROCESSING

For more facts Circle 437 on Reader Service Card

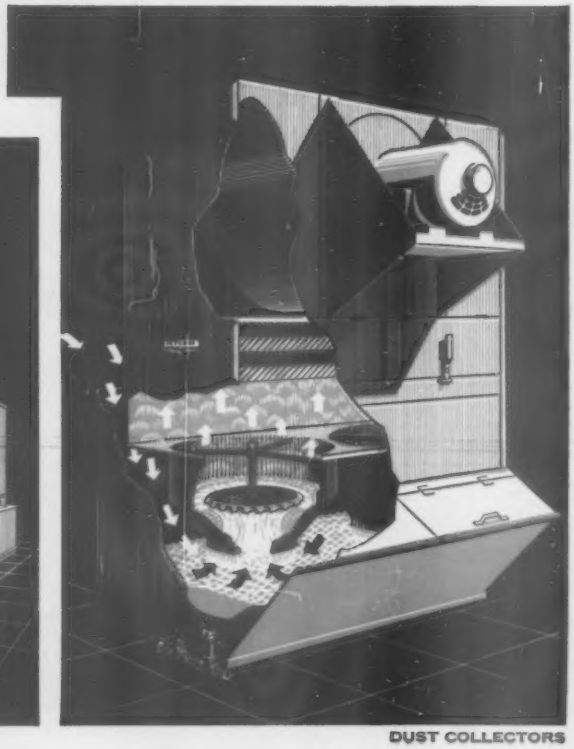
SPRAY GUNS



BATCH-TYPE OVENS

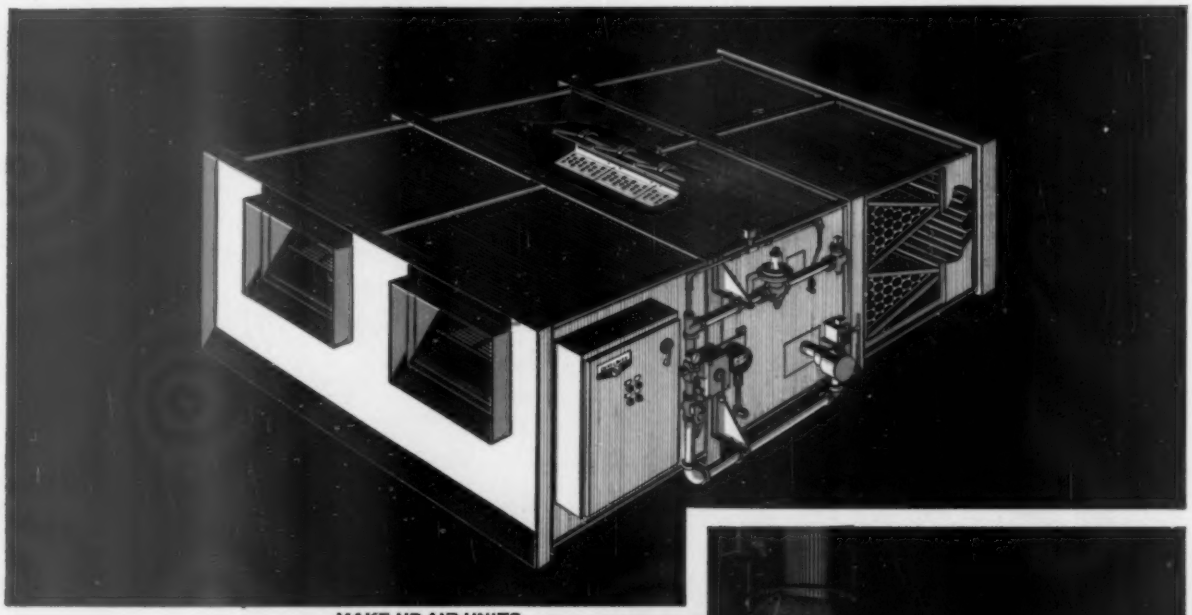


POWER SPRAY WASHERS



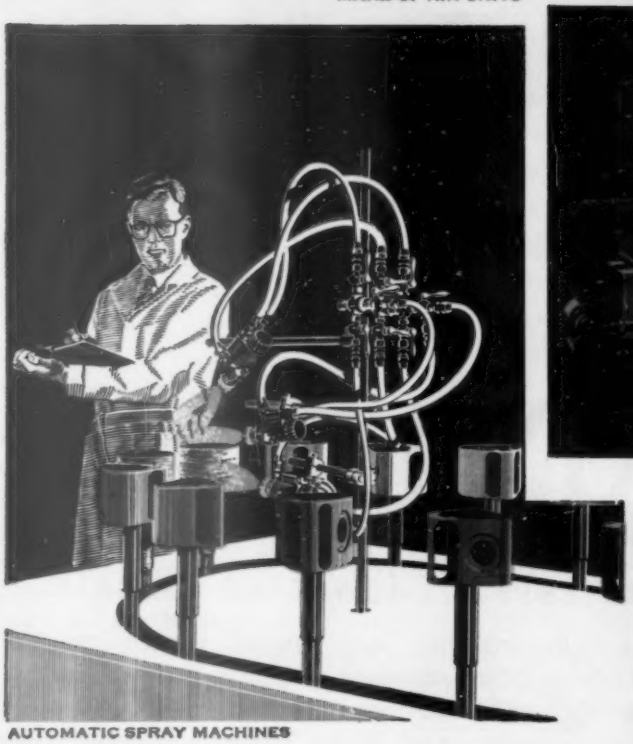
DUST COLLECTORS

DeVilbiss' complete line of equipment assures maximum performance and value for every coating dollar you invest. Whether you need individual units, matched components, or completely engineered finishing systems, DeVilbiss can deliver the goods. Only DeVilbiss designs, manufactures, installs, services and guarantees *all* major types of coating equipment. Our complete line—backed by testing, training and technical help—means Total Service. It's the service you've come to expect and the service you get—from DeVilbiss. Check the Yellow Pages for your nearest DeVilbiss representative.

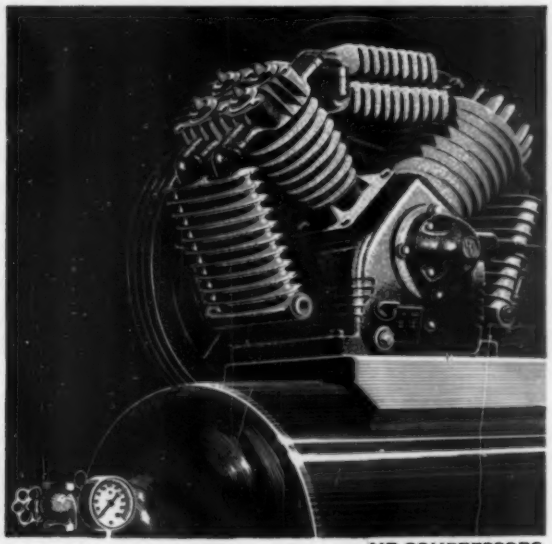


MAKE-UP AIR UNITS

SPRAY BOOTHS



AUTOMATIC SPRAY MACHINES



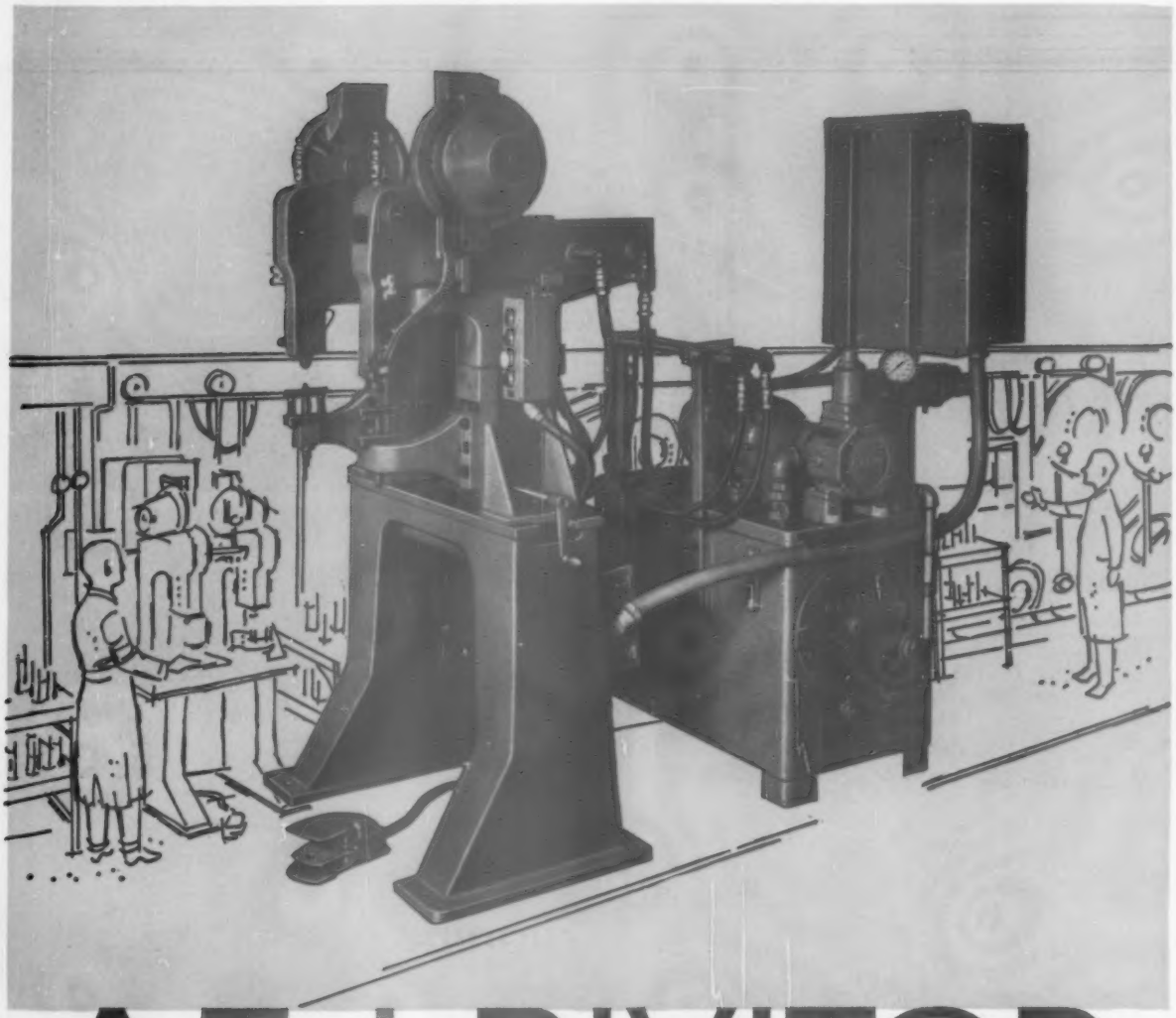
AIR COMPRESSORS

FOR TOTAL SERVICE, CALL

DEVILBISS

THE DeVILBISS COMPANY, Toledo 1, Ohio.
Also Barrie, Ontario; London, England; São Paulo, Brazil. Branch offices in principal cities.

For more facts Circle 438 on Reader Service Card



A T-J RIVITOR

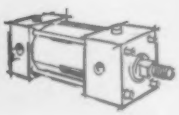
on your production line means higher production rate . . . lower unit cost!

T-J Rivitors and Clinchors are designed, engineered and manufactured to conform and operate efficiently on today's high-speed production lines. For whatever your product . . . if it demands a fastening assembly procedure . . . a T-J riveting or clinching machine adds to its high quality standards by their ability in providing long, rugged service-free life.

Many standard designs to choose from . . . or a T-J can be custom designed for your exact requirements. Write Tomkins-Johnson, 2425 W. Michigan Ave., Jackson, Mich., today. Ask for Rivitor and Clinchor Bulletin No. 646 or Clinchor Bulletin No. 555.

RIVITORS

CLINCHORS



CYLINDERS

CUTTING TOOLS

T-J TOMKINS-JOHNSON
JACKSON, MICHIGAN

For more facts Circle 439 on Reader Service Card

This man...
is running this locomotive

There is no one in the locomotive. The man in the picture can speed up, slow down, stop or reverse this train, *whether he is riding the locomotive or walking, or standing on the ground.* Both he and the locomotive are equipped with a new Union Switch & Signal remote control system for industrial switching locomotives. Because the operator always can be at the best vantage point, blind operations are eliminated and cars are spotted for loading, unloading or dumping more efficiently. This man can put a car *precisely* where he wants it.

You can minimize the hazards involved as freight moves around your plant with this unique remote control system. If you have a special problem such as moving cars into a thawing pit or under a loading chute, use a centrally located console control unit so one man has complete control over the entire operation.

Look over your in-plant locomotive operation and see if it couldn't be made safer and more efficient if the man running the train could always see what he was doing. Check the coupon for our illustrated Bulletin 187 on how our remote control systems can work for you.

Union Switch & Signal
Division of Westinghouse Air Brake Co.
Pittsburgh 18, Pennsylvania

☐ Please send Bulletin 187 on Union Switch & Signal remote control systems.

☐ Please have representative call.

Name_____

Title_____

Company_____

Address_____

City_____ **Zone**____ **State**_____

"Pioneers in Push-Button Science"

UNION SWITCH & SIGNAL
DIVISION OF WESTINGHOUSE AIR BRAKE COMPANY—
PITTSBURGH 18, PENNSYLVANIA
NEW YORK . . . PITTSBURGH . . . CHICAGO . . . SAN FRANCISCO

At Diebold, Inc., a total of 300 Perfection Schwank Gas *Infra-Red Heaters maintain a constant 70° in 11*

Diebold Cuts Heating Costs 35%...with

"We know it sounds impossible, but our Perfection Schwank *Gas* Infra-Red Heating System has reduced heating costs 35%," says William Roby, Assistant Plant Engineer at Diebold, Inc., Canton, Ohio. "Heating comfort alone would have justified our investment, but here's the clincher. In another 2½ years, our tangible savings in heating costs will have completely paid for the entire *gas* infra-red system! Gas keeps the *fuel* cost low. And there are practically no maintenance costs."

"It's as simple as this . . . in the Fall we turn the *gas*-fired system on . . . and in the Spring we turn it off. In nearly two full heating seasons, our total heating maintenance was a single dusting of the *gas* infra-red heaters. The *gas*-fired Perfection Schwank System keeps materials, floors, and machinery at a constant, uniform 70° – *an ideal temperature for employees.* What's more, the system is completely noiseless and draftless; prevents corrosion and maintains humidity at an optimum level for efficient production."

For more facts Circle 441 on Reader Service Card

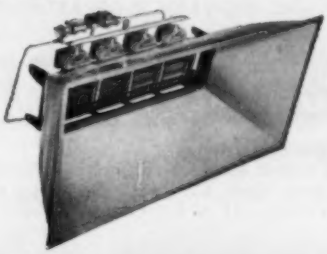
uninsulated buildings with total floor space of 180,500 sq. ft. and a total volume of 6,500,000 cu. ft.

Perfection Schwank Gas Infra-Red Heaters

As over 30,000 users have discovered, Perfection Schwank *Gas* Infra-Red Heaters give all the advantages of modern *gas* heat... high efficiency, precise control, speed, safety, cleanliness, dependability and unbeatable fuel economy.

Heat better for less with Perfection Schwank *Gas* Infra-Red Heaters. For complete information, contact your local Gas Company or write to Perfection Division of Hupp Corporation, licensee of American Infra-Red Radiant Co., 1135 Ivanhoe Rd., Cleveland 10, Ohio.

American Gas Association.



Approved by A.G.A., Underwriters, C.G.A. and C.S.A. Under Schwank U.S. Patents 2,775,294 and 2,870,830 and pending applications.

FOR INDUSTRIAL HEATING ...GAS IS GOOD BUSINESS!

General Electric Makes Eddy-current-coupling Drives

And they're dependable drives. The complete line includes water-cooled and air-cooled eddy-current couplings. We call them KINATROL* drives. Ratings are from 1 to 150 horsepower, operating from standard a-c power.

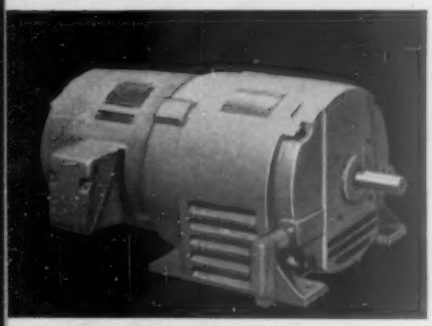
A General Electric KINATROL drive is not just another eddy-current coupling. For instance, in the water-cooled coupling, water control is packaged. You'll see much less external piping. Furthermore, the coupling is protected from flooding—and the air gaps are dry, preventing corrosion.

KINATROL couplings are compact, field proven and dependable. General Electric has had a good deal of experience in the engineering, manufacturing, and application of packaged adjustable-speed drives. And we know how important service is to a customer.

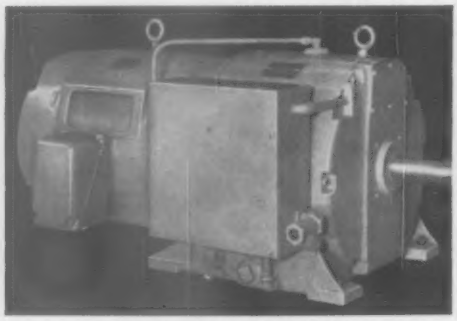
KINATROL —a good product, with the kind of service you can depend on. Please call your nearest General Electric Sales Office for further details.

*Trademark of General Electric Company

821-07



AIR COOLED, 7-1/2 to 100 HP



WATER COOLED, 25 to 150 HP

AIR COOLED, 1 to 5 HP

DIRECT CURRENT MOTOR AND GENERATOR DEPARTMENT

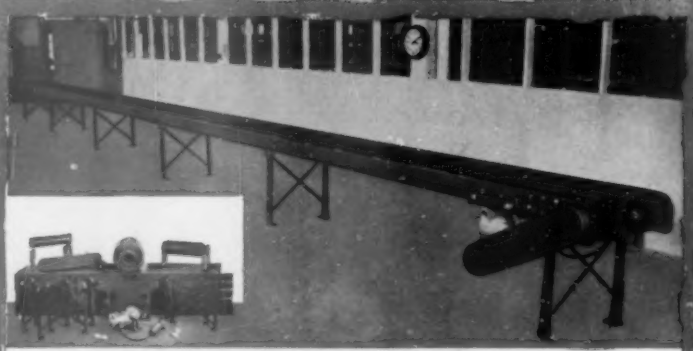
GENERAL ELECTRIC

ERIE, PENNSYLVANIA

For more facts Circle 442 on Reader Service Card

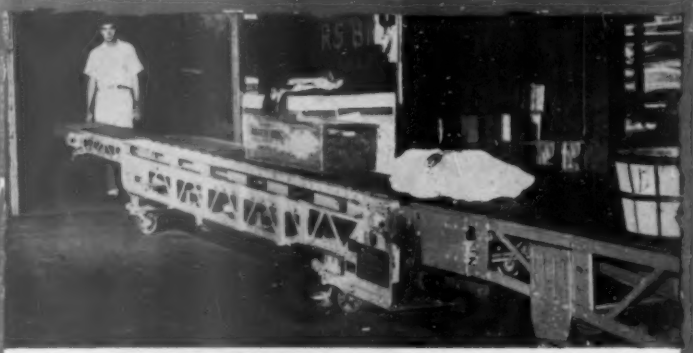
CSI Farquhar
MEMBER

YOUR OWN CUSTOM CONVEYOR SYSTEM with STANDARD COMPONENTS



A fast, easy package handling conveyor set up in a few hours! No expensive installations with these CSI-Farquhar standard components. Available either for horizontal or floor-to-floor usage.

- Installed in a few hours
- Constant or variable speeds
- Wide selection of lengths
- High capacity, incline or horizontal
- For all kinds of package handling



The versatile CSI-Farquhar EXPAND-O-VEYOR does a systematized loading job on boxes, crates, bags and other packages. Its built-in stretch gives you the *right* length for every loading situation.

Here are low cost conveyor units you can use in package handling and loading. Build high capacity conveyor systems with *pre-engineered* CSI-Farquhar units. High efficiency *without high costs!*

Set up a complete flow pattern from assembly line to shipping dock and on into the truck. Select units from the complete line—gravity, power belt, and portable—to make a systematized line *set up the way you want it.*

CONSULT YOUR YELLOW PAGES FOR THE NAME OF YOUR CSI-Farquhar DEALER or WRITE, WIRE or PHONE DIRECT!

SEND FOR COMPLETE DETAILS

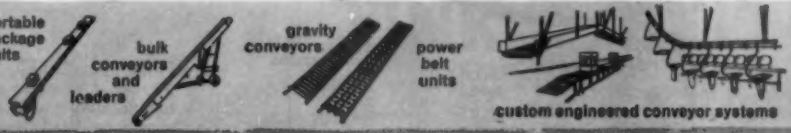
Ask for literature on CSI-Farquhar's complete line of package handling conveyors. Complete with all essential information on specifications, sizes, applications and power requirements. Get your copy today.

CONVEYOR SYSTEMS, INC.
A-B FARQUHAR DIVISION
6477 Main Street
Morton Grove, Illinois
(Chicago Suburb)
Phone: JUniper 8-0200

CUSTOM CONVEYOR ENGINEERING

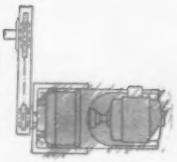
New Brochure No. 70 describes the complete service offered by CSI-Farquhar on engineered installations. It describes and illustrates many complex and specialized conveyor installations designed and built by CSI-Farquhar. Wide experience with all kinds of conveyors—trolley, in-the-floor types, spindle, mesh belt, barrel handling and many others. Our engineers can help you solve your conveyor problem efficiently and economically. Write for new Brochure No. 70 today!

CSI Farquhar

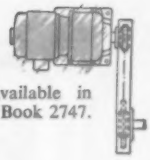


THE COMPLETE LINE OF CUSTOM AND PRE-ENGINEERED CONVEYING SYSTEMS

MOTOGEARS Designed for bracket-mounting, foot-type NEMA motors of *any enclosure, any make*. Motor switching takes just minutes. No need to drain oil. Bracket assures accurate motor positioning. Book 2747.



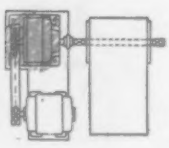
GEARMOTORS Perfect choice for close quarters! Simple gear trains and flange-connected NEMA motor combine for exceptional compactness. Available in double, triple and quadruple reductions. Book 2747.



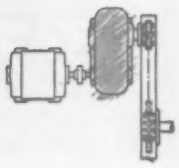
from LINK-BELT . . . industry's most comprehensive

One of these seven

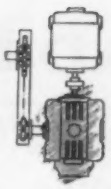
IN-LINE HELICAL GEAR SPEED REDUCERS Mount the motor *anywhere* . . . it needn't be direct-connected. And you save space with input and output shafts located on same planes. Available in double, triple and quadruple reductions. Book 2751.



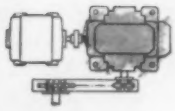
PARALLEL SHAFT SPEED REDUCERS 57 rugged, compact sizes! Built for continuous duty under the most punishing conditions. Easily withstand heavy shock loads, temporary overloads, moist or abrasive atmosphere. Available in iron and steel housings. Book 2719.



UNIVERSAL WORM GEAR SPEED REDUCERS Multiple mounting flexibility! Simple, compact design packs maximum hp in a rugged housing. Initial cost is low, mounting space requirements slight. Made with 2½, 3, 3½ and 4-in. centers. Folder 2724.



WORM GEAR SPEED REDUCERS Fan-cooled, compact, self-lubricated! Industry's *most complete* line for high-ratio speed reduction with right-angle takeoff. Single, double and helical worm gear combinations, with horizontal or vertical output shafts. Book 2824.



speed reducer line!

is just your speed

Full Layout Freedom!

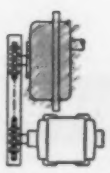
With Link-Belt's broad line to choose from, you can plan *any* speed reduction setup . . . *exactly* meet your requirements for ratio, space, shaft position, shock loading and other service factors. Link-Belt's seven basic types of speed reducers—each in a wide range of sizes and ratios—give you complete flexibility in drive layout.

There's another important advantage in calling on Link-Belt for your speed reduction needs. Link-Belt makes all related drive components—chains and sprockets, bearings, couplings—all dimensionally correlated with these reducers. This one-source service assures you of a smooth-working, perfectly matched set of equipment. No alignment problems . . . no need to exchange drawings with other suppliers.

See the Yellow Pages for your nearest Link-Belt office or authorized stock-carrying distributor. Look under "Speed Reducers." Ask for any or all of the catalogs listed above.

LINK-BELT

SHAFT-MOUNTED SPEED REDUCERS Install easily without special tools . . . in angular, horizontal or vertical positions with tie-rod flange mounts or screw conveyor adapter. Off-the-shelf availability. Books 2618 and 2718.



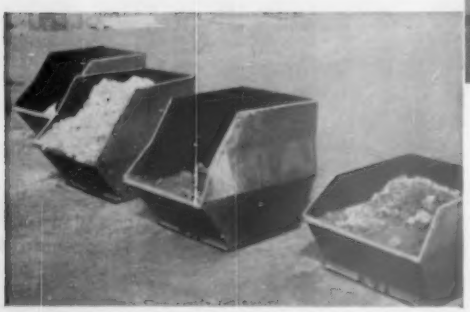
LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Warehouses, District Sales Offices and Stock Carrying Distributors in all Principal Cities. Export Office, New York 7; Australia, Marrickville (Sydney); Brazil, Sao Paulo; Canada, Scarboro (Toronto 13); South Africa, Springs; Switzerland, Geneva. Representatives Throughout the World. 15,583

HEIL LOAD LUGGER®

saves waiting time, double handling of waste at Johns-Manville plant...

Improved Housekeeping — Scrap and waste generated from the manufacture of Rock Wool insulation formerly was dumped into an open pit . . . and then loaded into trucks. Now it's dumped directly into a LOAD LUGGER detachable container. When filled, container is picked up automatically by a LOAD LUGGER truck . . . hauled to dump and returned. Plant area is always neat and clean. Good housekeeping, with refuse collected in container, also contributes to safety.

No Double Handling — Here a filled container is about to be picked up by the LOAD LUGGER. Driver simply attaches hoist chains and automatically lifts container aboard. No waiting to be loaded by a clamshell — no tying up equipment and man power — no double handling of waste.



Highly Flexible Operation — The 17 containers of various sizes and types are spotted in strategic positions on a two-acre rectangle around production building of Johns-Manville's Alexandria plant. They are easily loaded by cart, conveyor, front-end loader or clamshell. Picture shows an inplant trucker dumping a two-yard container into a six-yard LOAD LUGGER container.

•

LOAD LUGGER Systems are available for all types of industries — containers up to 16-cu-yd capacities — open- and closed-type. Write for name of your nearest dealer — get the cost-cutting story now.

One Truck, One Driver reduces truck and labor costs. LOAD LUGGER at disposal grounds dumps contents cleanly and quickly . . . returns empty and picks up another loaded container. Repeats process all day — never any waiting. Result: more efficiency . . . lower disposal costs because a single truck and one driver does the work of many. Besides waste, LOAD LUGGER System also handles raw materials such as slag and coke.

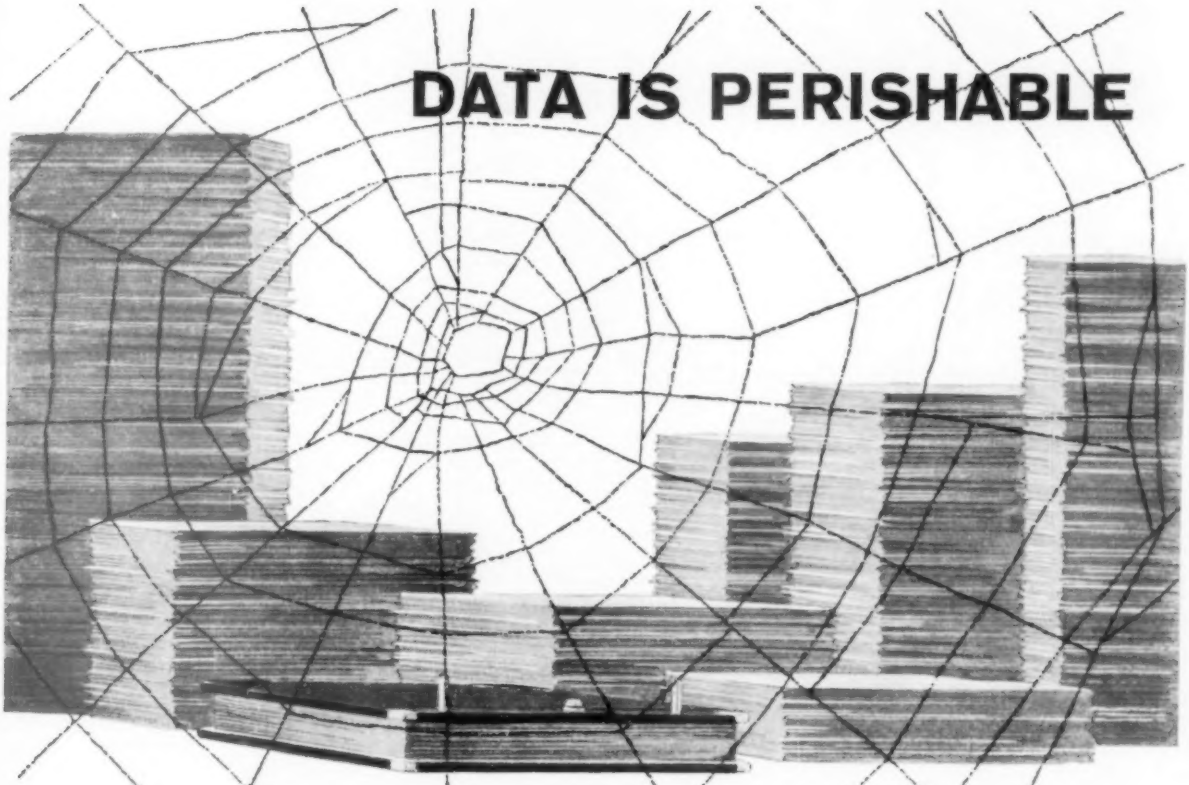
THE HEIL CO.
MILWAUKEE 1, WISCONSIN

Factories: Milwaukee, Wis. • Hillside, N. J.; Lancaster, Pa.; Cleveland, Ohio; Modesto, Calif.

LOAD LUGGER and HUGE HAUL SYSTEMS

Sales Offices: Hillside, N. J.; Washington, D. C.; Atlanta, Ga.; Cleveland, Ohio; Chicago, Ill.; Milwaukee, Wis.; Kansas City, Mo.; Denver, Colo.; Dallas, Texas; Los Angeles, Calif.; Seattle, Wash.

For more facts Circle 445 on Reader Service Card



LOST! a gold mine of control guidance for executives

All of the reports and statistics in the world have no value if you can't digest them and apply the information while it's fresh. That's why astute executives may use RCA Electronic Data Processing Centers to analyze vital inventory data quickly and accurately.

Take inventory, for example. Here, modern electronic data processing can give you constant coordination between sales and manufacturing. You minimize the risk of producing too much, or too little.

STRICTLY CONFIDENTIAL—All information handled through RCA Electronic Data Processing Centers is treated in absolute privacy. You can rely on RCA . . . The Most Trusted Name in Electronic Data Processing.

Specifically, with information you already have available, your nearest RCA EDP Center can help you with:

- **Accounts Receivable** • **Accounts Payable**
- **Sales Analysis** • **Assistance in Production Scheduling**

RCA EDP Centers are strategically located from coast-to-coast. For information write RCA EDP Service, Building 206-1, Cherry Hill, Camden 8, N.J., or phone WOodlawn 3-8000, Extension PY-5041.

RCA

The Most Trusted Name in Electronics

RADIO CORPORATION OF AMERICA

Get the Extra Power, Performance . . . .

SIOUX *AIR OR ELECTRIC*

NO. 330

NO. 313

NO. 325

The new H.D. 1" No. 482 Air Impact Wrench, the mighty big one, is intended for the kind of jobs that tear up ordinary 1" wrenches.

SIOUX Air Impact Wrenches deliver up to 15% more torque while consuming 30% less air!

SIOUX Electric Impact Wrenches such as the No. 330 illustrated, deliver the extra measure of efficiency, performance and freedom from trouble you expect from SIOUX.

Use SIOUX

. . . and Long Life of

IMPACT WRENCHES!

NO. 482

NO. 322

NO. 270

WHEN IT'S A SIOUX YOU KNOW WHAT IT WILL DO—SIOUX tells you the torque your air or electric impact wrench will deliver. Don't buy just a wrench. Buy certified SIOUX power!

The No. 270 SIOUX Slugger is an all purpose metal working tool. It cuts metal, breaks spot welds, splits nuts, shears bolts, punches out pins, and scrapes metal clean.

. . . . . all the way through!

ALBERTSON & CO., INC.

Sioux City, Iowa, U.S.A.

Canadian Warehouse: 379 Comstock Road
Scarborough, Toronto, Ont.

SOLD THROUGH DISTRIBUTORS IN U.S., CANADA AND OVERSEAS. FIND YOUR NEAREST U.S. DISTRIBUTOR UNDER "TOOLS, ELECTRIC" IN THE YELLOW PAGES.

▲ AIR & ELECTRIC IMPACT WRENCHES • DRILLS • SCREWDRIVERS • NUT RUNNERS • SANDERS • GRINDERS ▲ ELECTRIC POLISHERS • FLEXIBLE SHAFTS • PORTABLE SAWS • VALVE GRINDING MACHINES ▲ ABRASIVE DISCS

MATERIALS-HANDLING NEWS

NEW AND UNUSUAL APPLICATIONS OF BASSICK CASTERS THAT MIGHT BE ADAPTED TO YOUR HANDLING PROBLEMS

SPEED, FLOORS, OPERATING CONDITIONS DETERMINE CASTER LOAD CAPACITY

may modify catalog ratings

When ordering casters from the load capacity data given in catalogs, you must consider such variables as operating speed, condition or type of floor, and whether operation is to be manual or power pulled.

All of these may modify the published load ratings given on a caster or a certain type of wheel. The catalog data can only be an approximation.

Bassick—with a reputation to maintain as the world's largest caster maker—protects customers by making its ratings conservative. However, you should keep in mind the elementary facts on this page. In cases of doubt, submit full details on loads, operating conditions, speed, type of equipment to Bassick and ask for recommendations. We will be glad to supply them.

Wheels can give you more if you pick them right

Don't, for instance, expect a rubber-tread wheel to carry the same load as a metal or hard tread composition wheel of the same size. The rubber tread wheel can be counted on to carry about half as much.

Take the popular Bassick "H99." With a 2″ tread semisteel wheel 6″ in diameter, this caster is load-rated at 750 pounds per caster. The same caster with a Bassick "Alcore" aluminum cored rubber tread is load-rated at 410 pounds. (Tire & Rim Ass'n Rating, and Caster & Floor Truck Mfgs. Ass'n Standard.)

Then, too, for equal loads on equal floor surfaces soft rubber tread wheels will be harder to roll and swivel than an otherwise equivalent caster with steel or hard tread wheel.

Soft treads *do* give the advantages of increased floor protection and less noise. And a hard composition wheel like Bassick non-marking "Atlasite" can give you almost the carrying capacity of steel wheels with a great deal more protection to floors.

DID YOU KNOW

. . . that roller bearings do *not* increase load carrying capacity? But they do give easier starting and easier rolling under maximum loads.

DO YOU NEED A "RACE HORSE" OR "BULL ELEPHANT" CASTER?

Sometimes in caster selection you can trade speed for load carrying capacity . . . and vice versa . . . and sometimes with judicious planning you can get a moderate degree of both speed and power. For instance:

This 10″ Series "93" caster is a real "bull elephant." On static load it can stand up safely under 60,000 pounds. At the moderate speeds at which it is designed to move, Bassick rates it at 15,000 pounds. You wouldn't expect this caster to do the job of a "race horse" properly, and it won't.

On the other hand, here's a 10″ Series "TS" caster that's specially designed for carrying *power-pulled* loads at 5 to 10 miles an hour—trailer usage—high speeds for a caster. Load capacity under these conditions: 2,500 pounds per caster, with semisteel wheels. Bassick "Floating Hub" casters may be obtained for even higher speeds.

FLOOR CONDITIONS MAKE A BIG DIFFERENCE

If floors are fairly free from roughness and obstacles, you need not worry too much about moderate overloads. Bassick's conservative ratings allow a substantial safety factor. For instance, the 6″ semisteel-wheeled "H99," though rated at 750 pounds, would safely carry 1000 pounds if overloaded by a careless workman.

"Floating Hub" caster

However, if operating conditions are rough, use casters and wheels rated *above* the maximum loads anticipated. In addition, select a wheel large enough to ride easily over obstacles (Bassick "Floating Hubs" help here, too). The larger the wheel the easier it will roll.

SEE YOUR BASSICK DISTRIBUTOR

. . . he can solve most of your caster problems on the spot . . . and he stocks Bassick casters for immediate delivery. 1.44

THE BASSICK COMPANY
BRIDGEPORT 5, CONN.
IN CANADA:
BELLEVILLE, ONT.

see our catalog in Sweet's or write for copy

Symbol of SW Excellence

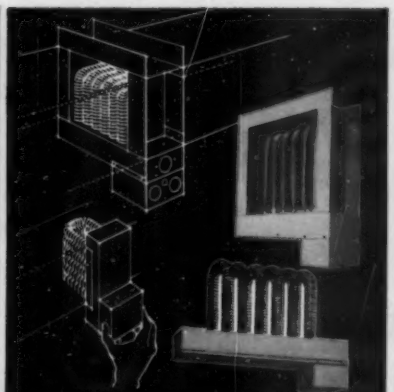
Bassick
A DIVISION OF
STEWART-WARNER CORPORATION

For more facts Circle No. 448 on Reader Service Card

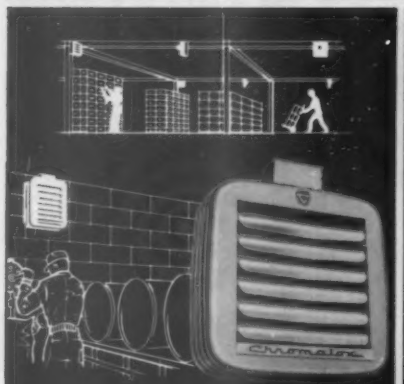
CHROMALOX ELECTRIC COMFORT HEATING

Clean, low cost, draft-free, maintenance-free heat for every imaginable comfort heating problem

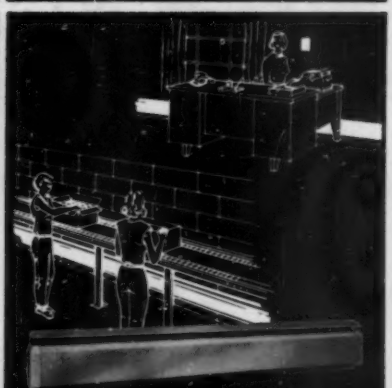
CONTROLLED BEAM INFRARED COMFORT HEATERS — Beam the heat where it's needed into exact "working zones" indoors or out. Positive comfort, easy installation, weatherproof.



FINTUBE AIRDUCT COMFORT HEATERS — The ideal heat source for central heating and cooling systems or for room-by-room, building-by-building temperature control, in new and old duct systems.



HEAVY-DUTY UNIT HEATERS — Keep men and materials at the right "working temperatures" for efficient production in large areas. For wall or ceiling mounting.



ELECTRIC BASEBOARD HEATERS — Uniform, clean, draft-free heat. Ideal for eliminating cold downdrafts of large window areas or poorly insulated outside walls.

At Your Service...

CHROMALOX "Answer Men"

ALBANY, N. Y.	HObart 3-0626
ATLANTA, GA.	TRinity 5-7244
BALTIMORE, MD.	Hopkins 7-3280
BLOOMFIELD, N. J.	EDison 8-6900
BOSTON, MASS.	CEdar 5-8040
BUFFALO, N. Y.	Phone TT6-4000
CHARLOTTE, N. C.	FRanklin 5-1044
CHATTANOOGA, TENN.	AMherst 5-3862
CHICAGO, ILL.	Harrison 7-5464
CINCINNATI, OHIO	Trinity 1-0605
CLEARWATER, FLA.	Phone 446-7706
CLEVELAND, OHIO	Prospect 1-7112
COLUMBUS, OHIO	AMherst 7-8260
COLUMBIA, S. C.	Phone 256-6067
DALLAS, TEXAS	Riverside 8-9004
DAVENPORT, IOWA	Phone 326-5233
DENVER, COLORADO	Glendale 5-3651
DES MOINES, IOWA	CHerry 3-1203
DETROIT, MICH.	KEnwood 8-2100 ELgin 7-0677
HOUSTON, TEXAS	CApitol 5-0356
INDIANAPOLIS, IND.	Melrose 5-5313
KANSAS CITY, MISSOURI	Victor 2-3306
LOS ANGELES, CAL.	LUdlow 9-6321
MIDDLETOWN, CONN.	Diamond 6-9606
MILWAUKEE, WIS.	Broadway 1-3021
MINNEAPOLIS, MINN.	Federal 6-6631
NASHVILLE, TENN.	CYpress 2-7016
NEW YORK CITY, N. Y.	WOrth 4-2990
OMAHA, NEBRASKA	341-7600, 7610
PHILADELPHIA, PA.	GReenwood 3-4477
PITTSBURGH, PA.	EMerson 1-2900
PORTLAND, OREGON	Capitol 3-4197
RICHMOND, VIRGINIA	ATlantic 8-8758
ROCHESTER, N. Y.	HAmilton 6-2070
ST. LOUIS, MISSOURI	Chestnut 1-2433
SAN FRANCISCO, CAL.	Underhill 1-3000
SEATTLE, WASH.	MAin 4-7297
SYRACUSE, N. Y.	GRanite 4-3933
WICHITA, KANSAS	Amherst 2-5647

Chromalox Electric Comfort Heating Equipment gives quiet, clean, safe, maintenance-free comfort. It costs less to install; and because chimneys, ducts, boilers and boiler rooms are eliminated—you have more usable work area. Whether your needs are for heating entire buildings, for spot comfort heating in exposed areas, for portable units for temporary use, for ceiling mounted radiant or unit heaters, for permanent built-in perimeter baseboard panels, fan-driven wall insert heaters or unit ventilators . . . there is a Chromalox electric heating system which efficiently and economically solves your needs. Get in touch with your representative for more information.

FOR MORE INFORMATION
Write for Catalog F-975E.
It gives answers to permanent or temporary efficient electric comfort heating—indoors or outdoors.

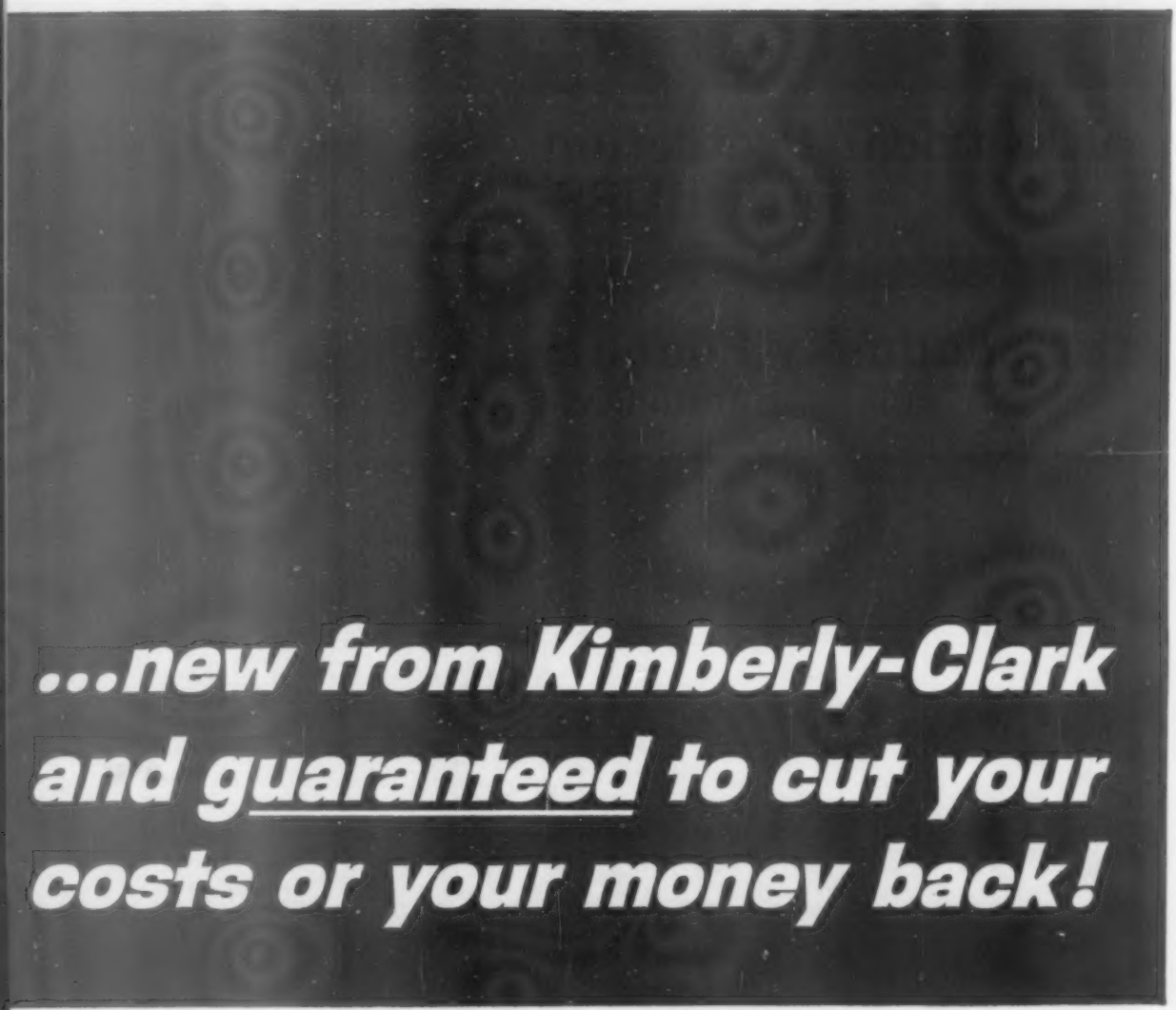
WI-34

EDWIN L. WIEGAND COMPANY
7518 THOMAS BLVD., PITTSBURGH 8, PA.

CHROMALOX ELECTRIC HEAT

PROCESS COMFORT

Kimtowels®
DISPOSABLE SHOP TOWELS



Your towel costs must come down or your money back!

Kimberly-Clark's 1-month guaranteed cost-cutting plan will prove to you that KIMTOWELS can reduce wiping costs. Here's how the plan works: you order a month's supply of Kimtowels. Use them in your entire plant (or in a single department) just as you would cloth wipers. At the end of one month, if your wiping costs haven't gone down, we will gladly refund the cost of the Kimtowels. Fair enough? Send coupon today.

- Look, feel, perform like cloth!
- Usable—over and over!
- Far more economical than cloth!
- Strong, rugged—wet or dry!

plus—no rental; no collecting; no sorting; no storage; no records; no pilferage!

Kimberly-Clark Department No. F-111, Neenah, Wisconsin

At no obligation to me, please rush information on Kimtowels "GUARANTEED COST-CUTTING PLAN."

Name.....

Firm.....

Street.....

City.....Zone.....State.....

Electrical Protection goes MODERN with BUSS Fuses...

at Sandusky Foundry & Machine Co.
Sandusky, Ohio

THIS ALL FUSE INSTALLATION PROVIDES NEEDED HIGH INTERRUPTING CAPACITY—AND SAVED AN ESTIMATED $20,000

A new electrical system was installed at the Sandusky Foundry and Machine Co., to feed a 1000 KVA annealing furnace and plant feeders and sub-feeders.

The engineers at Universal Marine Construction Co., Sandusky, Ohio who designed and installed the job, estimated the available fault current would be in the neighborhood of 75,000 amperes.

To be sure of obtaining the needed safe and dependable protection BUSS Hi-Cap and FUSETRON dual-element fuses were installed.

DEPENDABLE PROTECTION AT A $20,000 SAVING

Including the cost of fuses and switches, an estimated $20,000 was saved over what it would have cost to use mechanically operated devices with an interrupting rating of only 75,000 amperes.

This BUSS and FUSETRON fuse installation also permitted the electrical system to be co-ordinated, so outages on feeder and sub-feeder circuits can be limited to the circuit on which trouble occurs.

ELECTRICAL SYSTEM NOT DISTURBED WHEN TRANSFORMER CAPACITY WAS INCREASED

Shortly after the original installation, additional transformer capacity was added,—bringing the available fault current to approximately 150,000 amperes.

No change in the main service panels was needed, however, as the 200,000 amp. interrupting capacity of BUSS Hi-Cap fuses is still adequate to assure safe protection.

Neither was a change required in the protection of feeder circuits because FUSETRON fuses have adequate interrupting capacity to safely handle any fault that might occur on them.

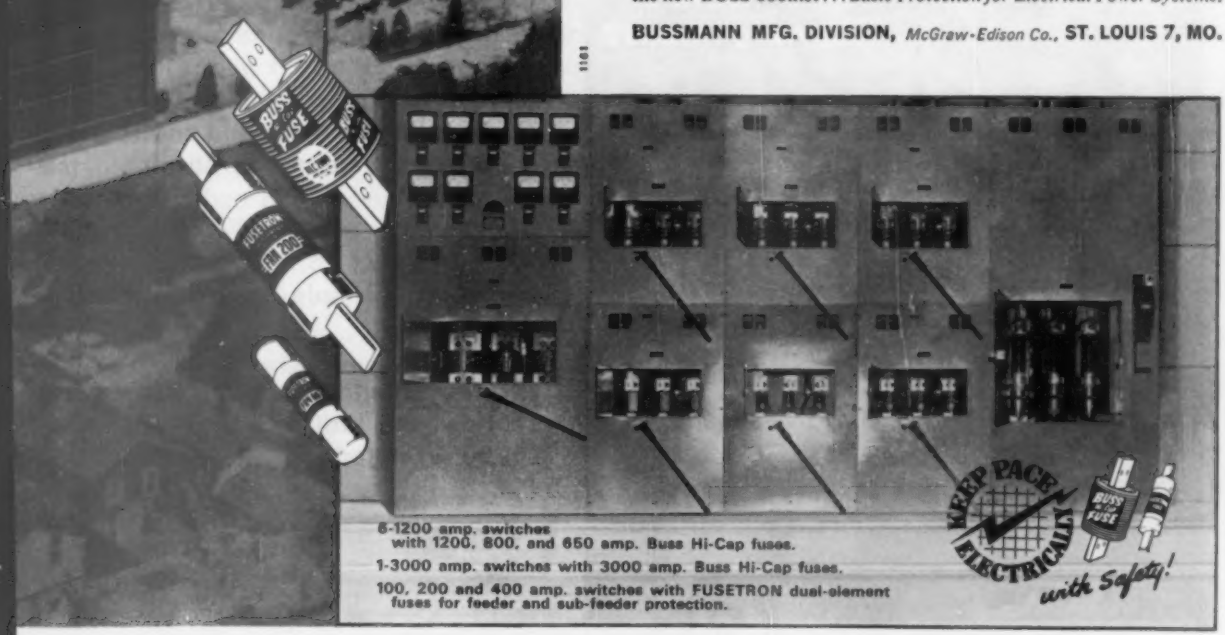
SAFE PROTECTION REMAINS SAFE

After years of inactivity, BUSS Hi-Cap and FUSETRON fuses provide the same safe, accurate protection if called upon to open as they would on the day installed. Dust, fumes, corrosion or age cannot increase the capacity of fuses or lengthen their blowing time.

For more information on how to select the proper fuse, write for the new BUSS booklet . . . *Basic Protection for Electrical Power Systems.*

BUSSMANN MFG. DIVISION, *McGraw-Edison Co.,* **ST. LOUIS 7, MO.**

1161


BUSS
FUSE
FUSETRON
6-1200 amp. switches with 1200, 800, and 650 amp. Buss Hi-Cap fuses.
1-3000 amp. switches with 3000 amp. Buss Hi-Cap fuses.
100, 200 and 400 amp. switches with FUSETRON dual-element fuses for feeder and sub-feeder protection.
KEEP PACE ELECTRICALLY
with Safety!

5 Basic Strapping Questions...

1. **Where do you put the straps and how many should you use?**

2. **What kind and size of strapping is best for the application?**

3. **Should you use hand tools, power tools, or automatic strapping machines?**

4. **Would a simple jig or fixture help?**

5. **How should the work, the material flow, the tools, and the equipment be arranged?**

Wrong answers are costly... right ones are free

If you have the right answers to these five questions, chances are that steel strapping is saving you money, making your products cost less to handle, ship, store, and receive.

But will those answers stay right? Your business does not stand still, any more than ours does. New products, new packages, new methods, new customer demands come along. Yesterday's right answers may be today's wrong ones.

You need right answers *on a continuing basis*—and you get them free from Signode, with the help of—

- trained packaging and shipping specialists.
- the widest selection of hand and power strapping tools and automatic strapping machines.
- the most complete testing and engineering facilities.
- 48 years of experience in solving packaging, handling and shipping problems.

Why settle for less? For right answers, call the Signode man near you, or let us put him in touch with you.

SIGNODE

First in steel strapping

SIGNODE
STEEL STRAPPING CO.
2663 N. Western Avenue, Chicago 47, Illinois
Offices Coast to Coast, Foreign Subsidiaries and Distributors World-Wide
In Canada: Canadian Steel Strapping Co., Ltd., Montreal • Toronto

For more facts Circle 452 on Reader Service Card

If you have anything to do with plant

take a good look at

Chances are you can get better lubrication... and save money in the bargain

To many people grease is an unglamorous and confusing subject. This is a shame, because grease is really a spectacular sort of lubricant. Nevertheless, people who don't understand it tend to forget it.

As a result, they run into all sorts of trouble. Sometimes they spend too much, buy the wrong thing, or misapply what they do buy. Sometimes they neglect to apply it at all.

True, a few years back, greases could be a headache, principally because in many cases the "right" grease simply didn't exist. To handle some of the tougher jobs grease-makers came up with the weirdest sort of concoctions. No wonder people put grease in the product-to-be-forgotten class.

But times have changed.

Grease-makers have found out a lot. They're making *better* products . . . and Sun's among the leaders in producing a full line of modern maintenance greases.

WHAT IS A GREASE?

It always pays to be sure you know what you're talking about. At least, asking such an academic question may bring to light some worthwhile points you've forgotten. Simply, a grease is a thickened oil. By his choice of thickener, a grease-maker can make a grease with high resistance to water, to high temperatures, or to both. By using additives and inhibitors he can get certain special properties, such as tackiness, high resistance to deterioration, and so on.

You might think of the thickener as a sponge that sops up oil, thus providing a means of keeping an oil *on the job*.

Greases come into their own wherever it's hard to keep oil where it belongs, or where it's impracticable to keep replacing oil that runs away.

You can't make a good grease with crankcase drainings. You must *start* with a very carefully chosen high-quality oil. The better oil makes the better grease.

WHAT MAINTENANCE GREASES ARE AVAILABLE?

There are several principal types: The work horses, made with calcium and sodium soaps, and the glamour greases, usually made with lithium soaps, and sometimes with other soaps or other kinds of thickeners.

Most greases come in several consistencies, or "thicknesses". How they stack up is best explained in the simple chart below.

WHAT ABOUT A SINGLE MULTIPURPOSE GREASE?

Despite what you may have been told, there is no such product. That is, there is no *single* consistency of a *single* type of grease that can handle *every* operating condition. This is the unvarnished truth.

		Handle Water?	OK For High Temperatures?	What Speeds & Loads?	Relative Cost
THE WORK HORSES	Calcium Soap Grease	YES	NO	ANY	LOW
	Sodium Soap Grease	NO	YES	ANY	LOW
THE GLAMOUR GREASES	Lithium Soap Greases & Others	YES	YES	ANY	HIGH

lubrication . . .

what's happened to grease

HOW TO MAKE UP YOUR OWN MIND

You're in luck here. Modern greasemakers are just as eager as you are to cash in on simplicity. So they're cutting down the number of greases they offer, and this makes grease selection simpler for you.

You can start yourself on the way to grease modernization by asking yourself just a few easy questions:

What do I want the most?

- Good lubrication?
- The economy of simplification?
- The economy of low initial costs?
- Or some combination of these?

Of course you want good lubrication. And this is *always* available, because today, somebody, somewhere, has the grease that will stand up to whatever working conditions you've got to handle. The grease you need exists.

So now you're down to the remaining questions: Simplification? Low initial cost? Or a combination? The chart at the bottom of this page tells the story.

HOW MUCH SIMPLIFICATION?

Sometimes you can simplify yourself into spending *more* money, not less. Just the same, most people buy too many greases.

Many plants can do quite well with a single maintenance grease. This is hard for many people to believe. But it can be done, economically, in an amazing number of plants. Yours may be one of these. Many plants, of course, need two or three greases, but rarely any more.

When you're simplifying, the trick's in knowing when to stop.

THE VITAL LAST STEP

Now . . . you need to go only one step farther: You need to find *products* that will handle *your* needs.

And you need *savvy*, to analyze your needs, to pick the best product mix, and to apply wisely the products you buy.

Again the answer's simple. Sun has the *products* and the *savvy*. If you're really interested in getting the most out of grease, your Sun man can help you. Call him. Put the challenge to him. Call him today and tell him that you want to talk grease.

TECHNICAL BULLETIN

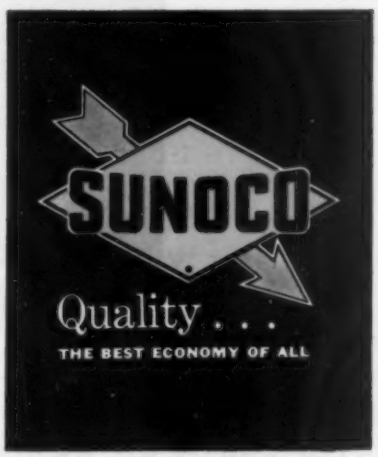
If you're not disposed to talk, then you should ask for Sun's new Technical Bulletin 69. It gives complete information on all of the basic types of maintenance greases in a comprehensive, orderly fashion, and lists full details on the major greases Sun makes.

For your copy write to:

SUN OIL COMPANY, Dept. F-11, 1608 WALNUT STREET, PHILADELPHIA 3, PENNSYLVANIA.

In Canada: Sun Oil Company Limited, Toronto and Montreal. Or call the Sun representative located nearest you.

	Relative Grease Costs	Storage & Handling Costs	Chances of Failure Through Misapplication	REMARKS
Simplification?	HIGH	LOW	LOWEST	Usually, you'll need a glamour grease or two, and this will increase grease costs. This is not necessarily true in plants with narrow ranges of operating conditions or where you don't need one grease to handle, for example, high temperatures and water. In these cases you can often achieve simplicity by using one or two modern calcium or sodium greases in place of half a dozen.
Low initial costs?	LOW	HIGH	HIGHEST	When you have no condition that requires glamour greases, you can use moderate-cost calcium and sodium greases. This keeps grease costs down, but they can be overbalanced by higher storage and handling costs. Failures from misapplication are also more likely.
Combination of simplification and low initial cost?	MODERATE	MODERATE	MODERATE	Just about always the best solution. The bigger the plant, the more varied the needs, the more important a compromise becomes. Of the three, this is the hardest course to chart; to follow it wisely, expert advice is a must.



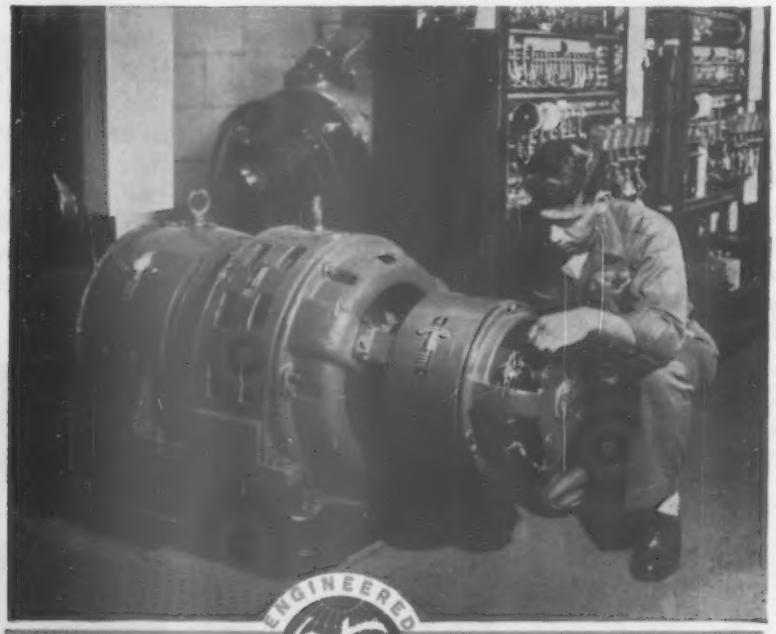
For more facts Circle 453 on Reader Service Card

Otis

FOR UNINTERRUPTED ELEVATOR SERVICE

NESTLÉ'S USES 11 OTIS FREIGHT ELEVATORS in its production lines where chocolate manufacturing is an art that depends on machinery. Uninterrupted production depends on alert maintenance of a vast variety of machines: roasters, grinders, giant hydraulic presses, conches, fast moving conveyors, packaging machines — and elevators. NESTLE'S own engineers keep the chocolate manufacturing machinery in mint condition. The elevators are the responsibility of local OTIS engineers.

Is elevator maintenance complex? Yes! It is an organization task requiring an unusual combination of skills. Plus a wide knowledge of parts, assemblies, functions, replacement procedures, testing and adjusting. Plus the availability of original replacement parts. Plus immediate service in emergencies.



OTIS ELEVATOR COMPANY • 260 ELEVENTH AVENUE • NEW YORK 1, N.Y.

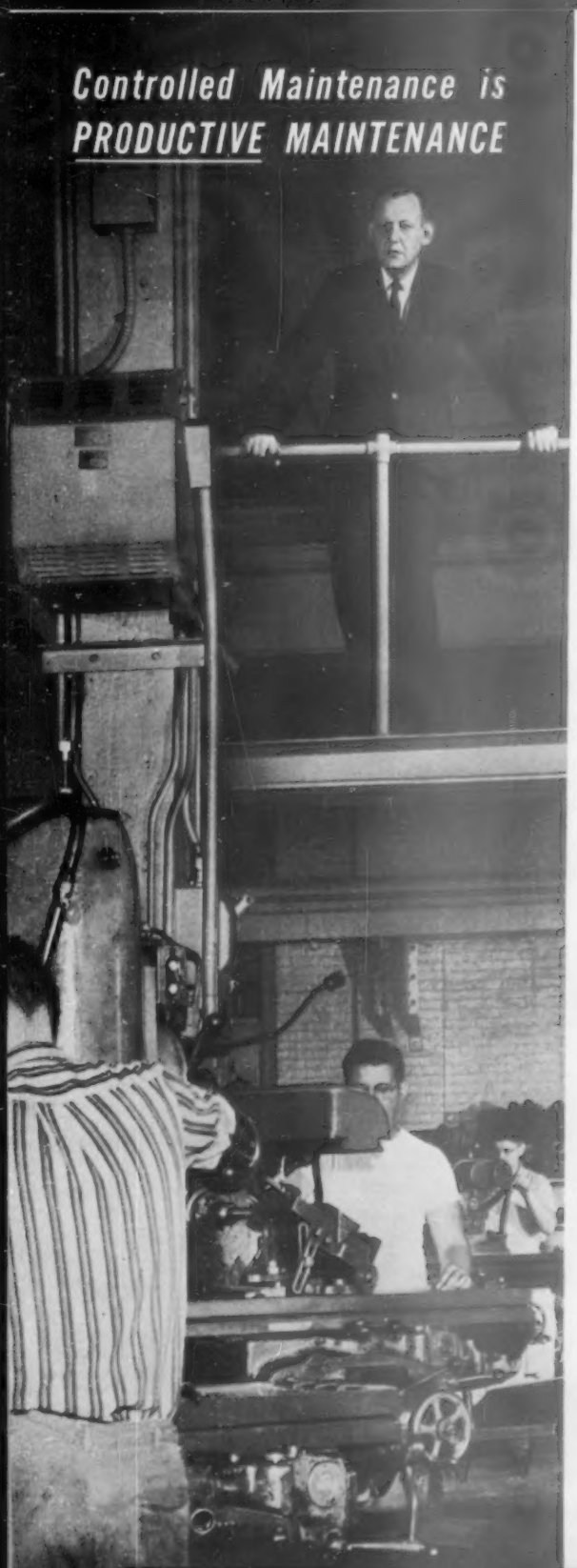
FACTORY

NESTLÉ'S®

FOR UNINTERRUPTED CHOCOLATE PRODUCTION

ONE MILLION POUNDS OF CHOCOLATE PRODUCTS DAILY. The Fulton, New York plant of The Nestlé Company, Inc., often ships one million pounds of chocolate products daily: Chocolate Bars, Quik Milk Drink, EverReady Cocoa, Chocolate Coatings and Syrups.

OFFICES IN 297 CITIES ACROSS THE UNITED STATES AND CANADA



Five Ways You Can Control Maintenance Costs In Your Plant

General Electric's *Productive* Maintenance program is designed to achieve minimum total cost per unit of production.

To make your plant's maintenance *Productive*, you must recognize every possible solution to each maintenance problem, know all the facts about each, and arrive at the most economic solution.

Here are five unique *Productive* Maintenance services offered by General Electric's nationwide network of Service Shops:

1. **ECONOMIC EQUIPMENT REPAIR**—Any repair job can be done in a variety of ways. G-E Service Shops use the *Productive* approach, helping you pick the cost-saving way to repair your equipment.

2. **IN-PLANT MAINTENANCE**—Experienced service technicians can bring their equipment right into your plant, and prove that you can save expensive downtime and other repair and maintenance costs.

3. **INSPECTION, TESTING, AND EVALUATION**—General Electric service technicians are best equipped to aid you in the appraisal of equipment reliability.

4. ***PRODUCTIVE MAINTENANCE* CONSULTATION**—Service Shop men are experts in the economics as well as the technology of apparatus repair and maintenance. They will use this knowledge to help you develop a *Productive* Maintenance program tailored to your plant.

5. **SPECIALIZED MACHINE SHOP WORK**—G-E Service Shops offer you extensive machine shop capabilities for dynamic balancing, metallizing, rebabbitting, manufacture of obsolete parts, and close-tolerance machining.

Feel free to discuss these services with your Service Shop representative—and write for bulletin GEA-7091, "*Productive* Maintenance Services," Section 801-04, General Electric Co., Schenectady, N.Y.

apparatus SERVICE SHOPS

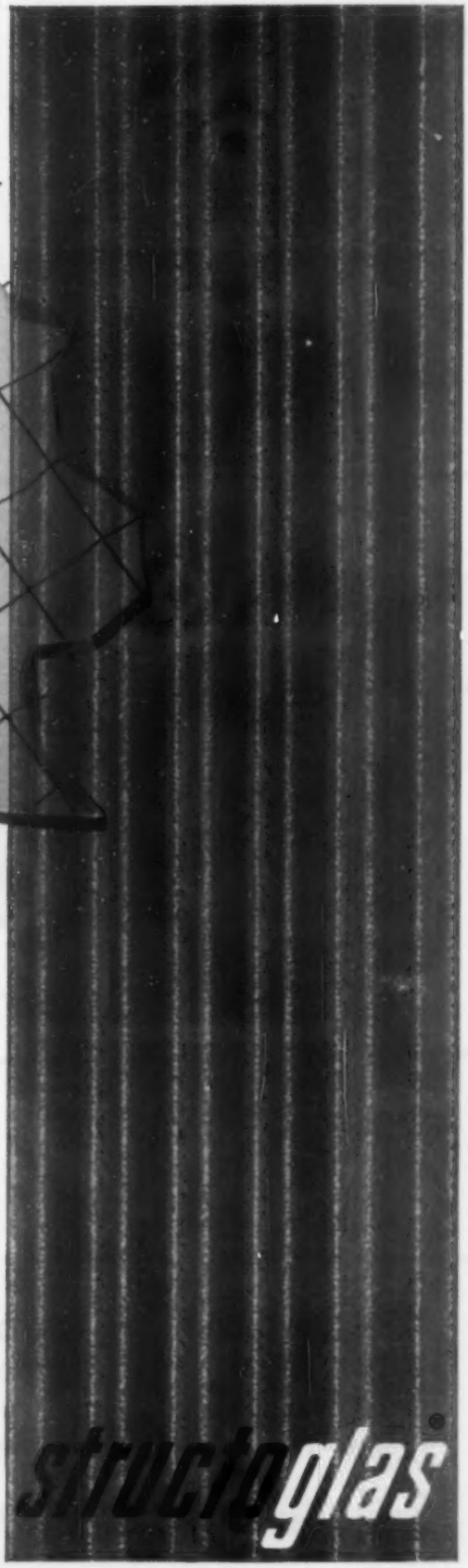
GENERAL ELECTRIC

For more facts Circle 455 on Reader Service Card

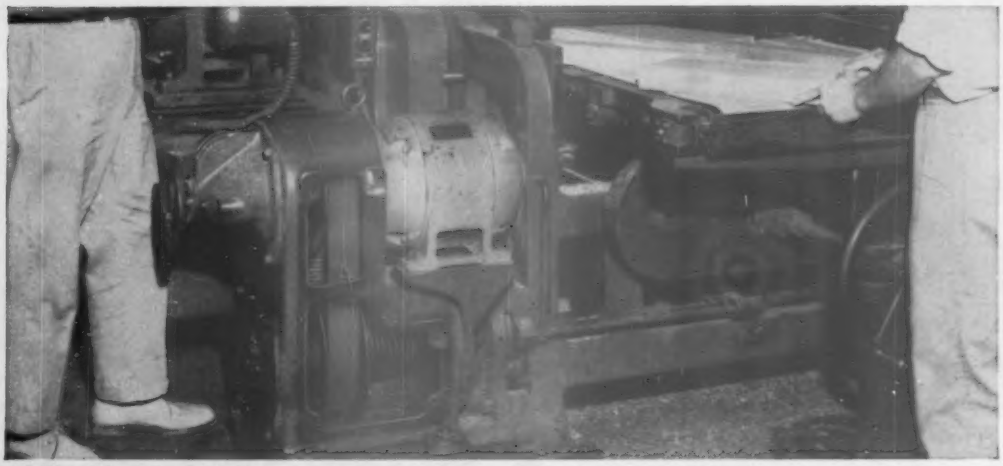
Just a jagged piece of window glass. Not too old. Not rare. But deadly when it fell from a plant skylight. Dangerous as it shattered from a warehouse window. Then management thought modern. Ancient, unsafe glazings were replaced with Structoglas A. Since Structoglas A panels and panes are fiberglass reinforced, they're shatterproof . . . also impact, vibration, twist and corrosion resistant. Vandalism breakage is almost nil. Structoglas in your office, plant or institutional building obsoletes the deadly old weapons. Worker morale is high under glare-free, carefree Structoglas A. And 98 per cent ultraviolet ray filtration prevents fading, checking and spoilage of material. By the way, maintenance gangs used to *wash* those potentially dangerous skylights and windows. Quite an annual expense item. But now with Structoglas, rain keeps it clean. To say nothing of the good looks it adds to older buildings. . .and new ones. Install Structoglas A and get that obsolete weapon off your premises.

write for additional information and specifications

STRUCTOGLAS INC. • 11701 Shaker Blvd. • Cleveland 20, Ohio

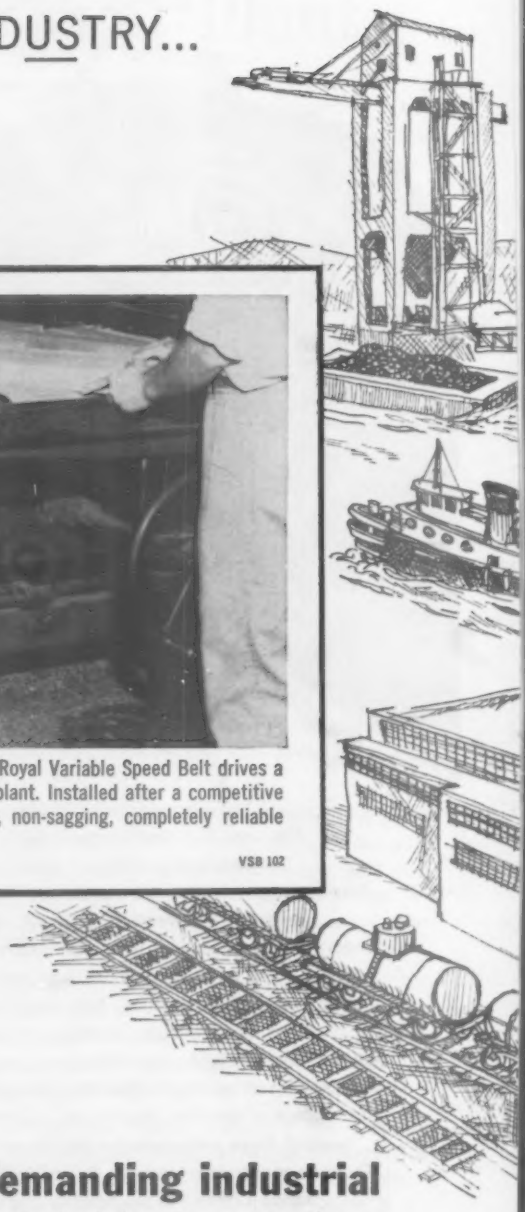


US AT THE HEART OF INDUSTRY...

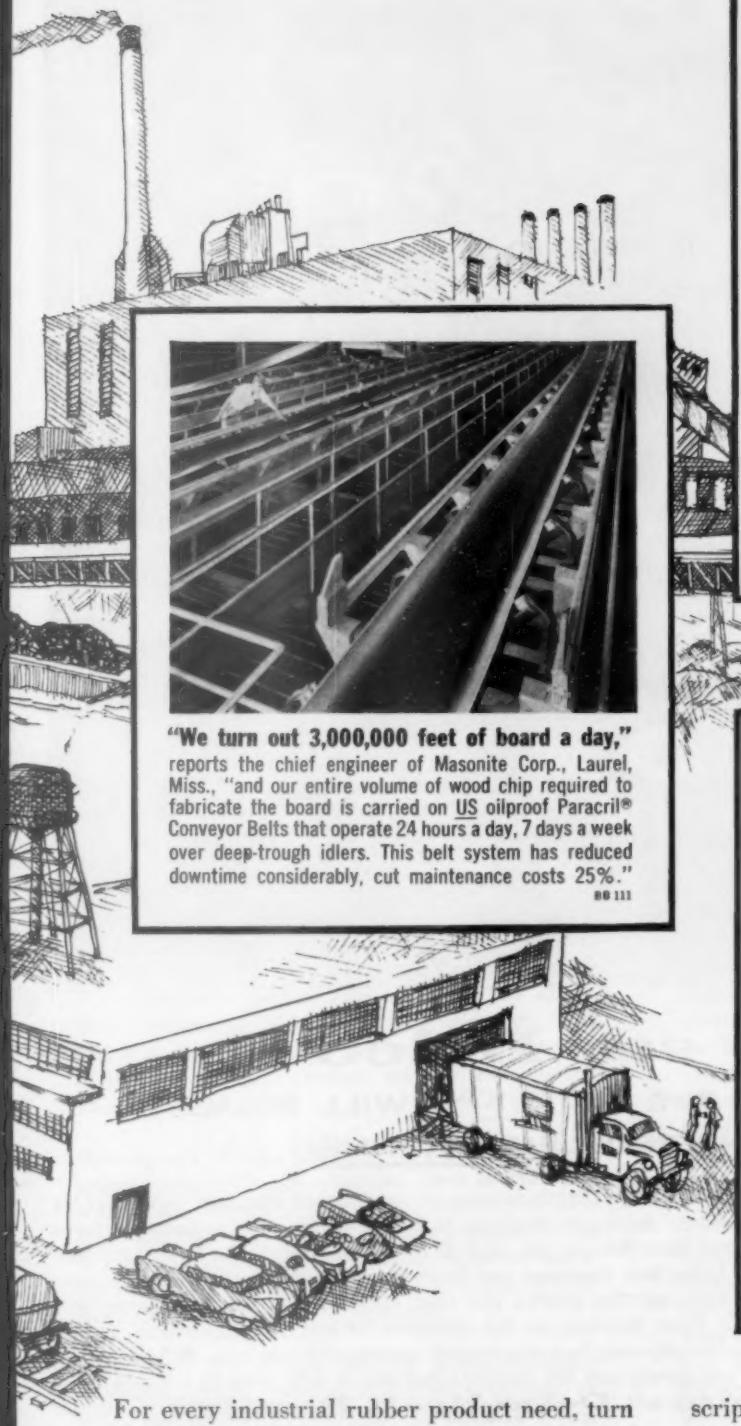


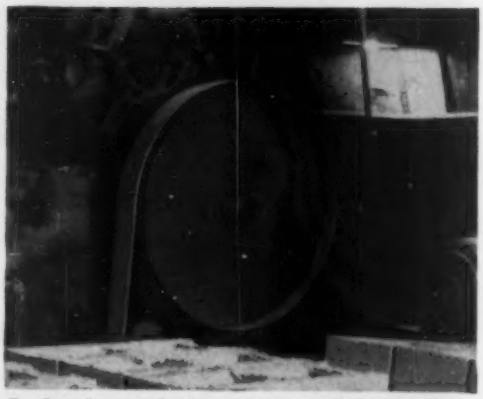
Making things hum for the world's largest piano manufacturer, this U. S. Royal Variable Speed Belt drives a Whitney double planer 2 shifts a day, 5 days a week at Wurlitzer's De Kalb, Illinois, plant. Installed after a competitive belt failed, this belt requires no maintenance, will last far longer, is non-squashing, non-sagging, completely reliable at speeds of 10 to 2,000 rpm.

VSB 102



Wherever you find the tough and demanding industrial tasks, you'll find US Industrial Rubber Products helping to make them easier and more efficient. As the world's largest producer of Industrial Rubber Products, US knows and can meet the needs of all industry.





Performing perfectly under one of the toughest applications for any belt—an atmosphere of stone dust and flying rock particles—U.S. Royal V-Belts have outlasted all other belts at Bethayres Concrete Products, Pa. These belts have demonstrated unequalled toughness, length stability, and smoothness despite the severe conditions under which they must perform.

VB114

"We turn out 3,000,000 feet of board a day," reports the chief engineer of Masonite Corp., Laurel, Miss., "and our entire volume of wood chip required to fabricate the board is carried on US oilproof Paracril® Conveyor Belts that operate 24 hours a day, 7 days a week over deep-trough idlers. This belt system has reduced downtime considerably, cut maintenance costs 25%."

BB 111

Reducing friction and wear on rods and shafts, exceptionally high-quality US Centrifugal Pump Packings resist hot, cold, and salt water; seal against oil, brine, weak acids, caustic solutions, and ammonia. These braided asbestos packings are used as standard equipment by many leading centrifugal pump manufacturers.

P 105

For every industrial rubber product need, turn to US. For Conveyor Belts, V-Belts, the original PowerGrip "Timing"® Belt, Flexible Couplings, Mountings, Fenders, Hose and Packings . . . custom-designed rubber products of every description. Discover why U.S. Rubber has become the largest developer and producer of industrial rubber products in the world. See your U.S. Rubber Distributor or contact US directly at Rockefeller Center, New York 20, N. Y.

WORLD'S LARGEST MANUFACTURER OF INDUSTRIAL RUBBER PRODUCTS

United States Rubber

MECHANICAL GOODS DIVISION

For more facts Circle 457 on Reader Service Card

simply say Delco

AND THE MAN WITH THE RED PHONE WILL SOLVE YOUR BEARING PROBLEM ANY TIME!

Your *authorized* Delco New Departure and Delco Hyatt Bearings Distributor may be watching the late, late movie, but his Red Phone Service stands ready—*any time*—for immediate delivery of bearings. In his warehouse are thousands of types and sizes of bearings, standard and special, more than likely the one you need. ■ He's backed up by the Red Phone Network, a unique direct line service that commands all Delco New Departure and Delco Hyatt bearing stocks in factory warehouses across the country . . . more than 7,000,000 bearings! The bearing you want, wherever it is, can be delivered in a matter of hours. ■ Delco New Departure and Delco Hyatt Bearings are the standards of industry—dependable, durable and precise. They're providing exceptional service on virtually every type of industrial equipment in use today. ■ So whenever you replace bearings—in routine maintenance or emergency, call the Bearings Distributor who gives Red Phone Service. Specify **Delco New Departure** and **Delco Hyatt Bearings**, distributed nationally through **United Delco.**

UNITED MOTORS SERVICE, Division of General Motors

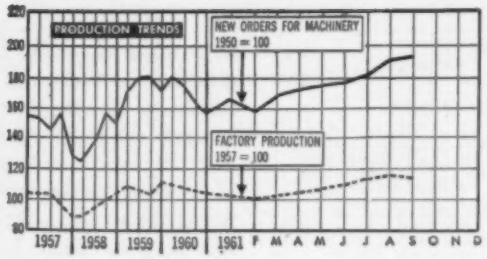
LOOKING AHEAD IN BUSINESS

A FACTORY PRESS-TIME REPORT

FACTORY FIGURES OF THE MONTH

Indicator	SEPT.[p] 1961	AUG.[r] 1961	SEPT. 1960
New Orders for Machinery (exc. elec.)[1]	192.0	191.0	174.0
Contracts for Industrial Construction[2]	105.0	96.0	179.0
Factory Production[3]	112.0	113.0	107.0
Consumers' Prices (cost of living)[4]	128.1	128.0	126.8
Industrial Prices (materials, supplies)[4]	127.5	127.4	127.9
Manufacturing Employment (millions)[4]	16.4	16.2	16.5
Total Employment (millions)[5]	53.9	53.4	53.7
Unemployment (millions)[5]	4.1	4.5	3.4

p = preliminary r = revised



Sources: 1. McGraw-Hill Dept. of Economics (1950 = 100); 2. Engineering News-Record (1950 = 100); 3. U. S. Federal Reserve Board (1957 = 100); 4. U. S. Dept. of Labor, Bureau of Labor Statistics (1947-49 = 100); 5. U. S. Dept. of Labor, Bureau of Labor Statistics.

Steady profit climb to carry into '62

THE OUTLOOK | **Corporate profits head for a new high early next year, spurred by rising production and output per man-hour. Third-quarter profits were up 5% from second quarter, but still below previous peaks.**

When the corporate profits figures for the third quarter of 1961 are published in a few weeks, they should contain some decidedly cheerful news. All indications are that **corporate profits ran at a rate of about $47.5-billion,** up 5% from the previous quarter. At that pace, they were back to the level of the first quarter of 1960—a period of excellent business, although not an all-time high.

Between now and the beginning of the 1962 baseball season, **profits should continue on a steeply upward path to new peaks.** Rising steadily, quarter after quarter, the rate of corporate profits could average $55-billion (not including the inventory valuation adjustment, which is normally less than $.5-billion) in the first quarter of next year.

This forecast has a solid foundation. It depends on the relationship between profits and the total production of goods and services observed in past business cycles. Of course, nothing is more certain than the fact that history won't exactly repeat itself, but it is a good gauge of what can be expected. Historically, (postwar history) profits have scored 2.8 percentage points increase for each one point gain in the industrial production index. On that basis, 40% increase in profits from the first to the last quarter of this year is possible. More likely, though, **it will take until the first quarter of next year before profits rise 40% above the first quarter of 1961.**

What will push profits higher in the months ahead? Mainly a rise in production throughout the economy. Since the first quarter of this year the Federal Reserve Board's production index has risen 11% and will surely go higher before the bells ring on Dec. 31. From the third-quarter average of 113, the production index will probably rise to 124 in the same period next year. **Gross national product, the broadest-based gauge of national production, will rise to $571-billion** in the third quarter of 1962 versus $530-billion in that period this year. Thus corporate profits will get a real boost from gains in production.

Another important element in the profits outlook is rising manufacturing productivity. Instead of increasing steadily, year in and year out, productivity goes by leaps and bounds. When the rate of capacity utilization is rising—as it is now—productivity rises. For the first three-fourths of this year, productivity was up about 5%. If the year's gains so far are continued, output per man-hour will rise 7.5% for the year as a whole. Right now many plants are coming into their most efficient ranges of production. The industrial operating rate has bounced back to 84% from 75% at the beginning of this year. **By summer of next year many industries will be pressing at the ceiling of their capacity and scrambling for more via capital spending.** Thus the outlook for profits—a bright one—is easily achievable without anything as dramatic as a "superboom."

WASHINGTON WIRE

A FACTORY PRESS TIME REPORT

A number of other industries can look for more liberal tax-depreciation allowances similar to those granted last month to the hard-pressed textile industry. But the who and how are still being worked out by the Treasury. In general, such relief will be granted in the coming months to manufacturing industries that (1) have been hurt by foreign competition and (2) face an increased rate of obsolescence because of technological advances. What the Administration has done is permit the textile industry to write off, for tax purposes, equipment in, say, 15 years instead of the normal 25 to 40 years.

There is more to the move, however, than relief for an ailing industry. Through the textile industry, the Administration is hitting at the hard core of protectionist sentiment in Congress. It hopes that by granting this kind of tax relief to sick industries, it can win support next year for its 8% tax-credit proposal. Even more important, it hopes to gain support for its request for authority to cut tariffs under a renewed reciprocal trade act.

Will your industry qualify for a faster tax write-off? The guideline was laid down by the Treasury in the textile case: "Careful attention was given to the rapid technological advances which have occurred in the industry, particularly in the past two or three years, and the further advances reasonably to be expected in the near future. The pressure for innovation is accentuated by the keen competition among domestic producers and from foreign mills. It is believed that recent developments and machines now on the drawing boards . . . will engender further technological advances which will accelerate the rate of obsolescence in the industry."

The Kennedy Administration has the budget blues. Coming into office last January, the President and his aides had an idea that the budget deficit for fiscal 1962, which began July 1, could be held to $2-billion. Some of his economic advisers even looked far enough ahead to see the possibility of a $10-billion surplus in fiscal 1963. Then they came face-to-face with the realities of increased spending for space and defense.

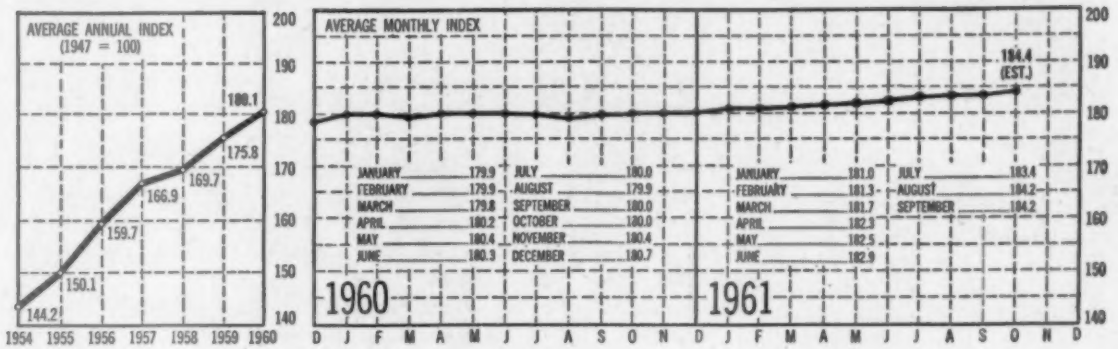
This is the current situation: Spending in fiscal 1962, once estimated at $80.8-billion, is now expected to exceed $89-billion. With revenues estimated at about $82-billion, a $7-billion deficit is the obvious result. As for fiscal 1963, the Administration still insists it will balance the budget for that year—despite another spending increase that will bring the total to $92-billion. Some economists feel the business upsurge will bring in enough money into the Treasury to balance the 1963 budget; others are not so sure.

General price stability until mid-1962 is expected by Administration economists. And they believe the stage is being set for continued stability beyond that date. Chairman Walter Heller of President Kennedy's Council of Economic Advisers argues that the rise in hourly wage rates is steadily slowing down while output per man-hour is rising sharply. This pattern is lowering labor costs per unit of production. Heller is convinced that it will lead to continued expansion of business activity without inflation.

The next critical period for prices, warns Heller, will come in mid-1962. At that time, the economy may be in the middle of a boom. The cushion obtained from the current spurt in productivity will have vanished and wage increases may begin to outstrip productivity. Business will be good, and manufacturers may be able to make price rises stick. In this case, says Heller, a renewed period of creeping inflation would become a real threat.

COST INDEX OF PLANT MAINTENANCE

A FACTORY PRESS TIME REPORT



Ten-month cost climb levels off

	AVERAGE 1960	SEPT. (Preliminary)	AUG. (Revised)
Building and Facilities Index	170.6	175.5	174.7
Materials	140.1	139.3	138.1
Brick	154.9	155.5	155.2
Elec. fixtures	131.9	130.9	130.9
Elec. switches, boards, fuses	183.3	183.2	183.2
Elec. wire, copper	147.0	142.4	142.4
Glass	148.1	147.7	147.7
Gutters, spouts, ducts	180.3	180.4	180.4
Gypsum products	140.9	145.3	145.3
Heating equipment	125.5	120.9	120.9
Lumber	128.7	122.3	122.0
Millwork	156.7	149.8	149.8
Paint	130.2	134.3	134.3
Pipe, cast iron	170.4	170.4	170.4
Pipe, steel	190.7	188.7	188.7
Pipe & tubing, copper	151.5	134.3	126.2
Roofing	113.9	121.4	121.4
Sanitary fixtures	162.4	161.8	161.8
Sash, metal frame trim	137.4	137.0	137.0
Solder	122.5	141.6	138.0
Steel, structural	236.3	236.3	236.3
Tanks, steel	139.6	136.7	136.7
Valves & fittings	167.8	163.8	163.7
Wire mesh	163.8	156.7	156.7
Labor	191.0	199.6	199.1
Carpenters	177.3	186.5	186.0
Electricians	199.4	208.8	207.8
Painters	196.2	203.6	203.6
Equipment Index	184.2	187.9	188.2
Materials	177.6	179.5	179.0
Abrasives	157.9	157.4	157.4
Alloys, non-ferrous	123.2	136.6	134.7
Bars & plate, steel	227.2	227.2	227.2
Bearings	160.0	152.9	152.9
Belting	160.9	163.2	163.2
Bolts, nuts & screws	225.2	248.0	244.6
Chain	187.4	193.8	193.8
Controls (electrical)	183.3	183.2	183.2
Gear-reduction units	181.1	174.5	174.5
Hand tools, mechanics	204.5	208.3	208.3
Lubricants	125.7	125.7	125.7
Motors	145.0	132.5	133.1
Non-ferrous metals	135.8	129.2	129.2
Precision tools	158.2	166.2	166.2
Pumps	235.4	197.0	197.0
Tools, cutting	186.8	182.0	182.1
Valves & fittings	167.8	163.8	163.7
Labor	188.7	193.5	194.3
All mfg. labor	185.1	190.0	190.8
Machine tool labor	192.1	197.0	197.8
FACTORY'S COST INDEX	180.1	184.2	184.2

At long last, FACTORY's Cost Index of Plant Maintenance has taken a breather. In September the Index held perfectly steady at 184.2. Despite outward stability, however, there were changes in the prices of several items.

Materials costs were generally higher. In the equipment component of the Index, for example, there were five price changes and all were on the up side but two. One decline was for motors, off 0.6; and one for cutting tools, off 0.1. More than counterbalancing were a 3.4 hike for the index of nut, bolt, and screw prices, and a 1.9 increase for non-ferrous alloys. Valves and fittings were also higher in September, but only by a 10th of a point.

In the same component of the Index, labor costs dropped back 0.8 to break a four-month rise. Manufacturers cut the number of labor hours they required in September, thus trimming their costs slightly. The index of general manufacturing labor costs dropped from 190.8 in August to an even 190 in September. Machine tool labor dropped an equal amount from 197.8 to 197.

In the building and facilities component of the Index, both materials and labor costs were higher in September. In materials, brick was up 0.3, and copper pipe and tubing prices were up 8.1.

In contrast to manufacturing costs in September, the earnings of maintenance personnel were firm. A 0.5 increase in the index of carpenters' earnings was chalked up, and an even 1.0 increase for electricians was recorded. The index of all labor costs in the building and facilities category moved 0.5 ahead to 199.6. A continuation of the relatively weak behavior of manufacturing wages is likely for the next few months. But costs of painters, carpenters, and electricians will probably creep upward.

LOOKING AHEAD IN LABOR

A FACTORY PRESS TIME REPORT

More changes brewing in NLRB

Some hard new clues to the shifting fortunes of labor and management under the Kennedy Administration are coming from the National Labor Relations Board. This vital agency—which interprets the Taft-Hartley rules for employer and union behavior—plans significant changes in the way the law is applied. The 1947 labor-management law itself remains unchanged. But the five-man agency (working with a majority of Kennedy appointees) shows clear signs that it means to reverse many NLRB decisions made during the Eisenhower years.

For the most part, labor unions will fare much better than management when the Board decisions are handed down. NLRB's new chairman—Frank McCulloch—warns that harsher Board remedies will be the lot of both unions and employers who violate the law. Specifically, McCulloch cites a plan to be used against management when a union supporter is discharged unjustly during a union-organizing campaign. The old "punishment" was a delayed Board order for reinstatement. The new plan would "saddle" the errant employer with the insurgent union for a 12-month period.

Another new NLRB plan is aimed at an employer who refuses to bargain. In this situation, McCulloch says, NLRB might demand that the employer (1) agree in writing to maintain existing conditions at the plant, and (2) make reasonable counter-proposals to union demands.

Though the federal agency is just beginning its policy shift, it has already come up with two decisions that show clearly the road it intends to follow.

Here's what happened in each decision:

- By a four-to-one majority, the Board ruled that under Taft-Hartley the controversial "agency shop" contract clause *is* a legal union demand. This provision—which the old Board knocked down—requires non-union workers to pay service fees equivalent to union initiation fees and dues to the union in their plant *(General Motors vs. UAW)*.
- An employer who shifted his dress plant from Philadelphia to the South was ordered by NLRB to rehire his old employees; pay their lost wages, travel, moving costs *(Sidele Fashions, Inc., vs ILGWU)*.

Here's what the decisions mean to you:

- The "agency shop" case—the more important of the two—goes to the heart of the heated issue of compulsory unionism. This is a comparatively new union demand. It exists in an estimated 6% of industrial union contracts. Generally, it's offered as a bargaining substitute where union security agreements are either banned by state "right-to-work" laws or where employers successfully resist the union shop, which requires a worker to join a union to hold his job.
- In the GM vs UAW case, the Board held that Taft-Hartley permits all forms of union security up to the union shop. It specifically intends that workers labeled as "free riders" by unions could be required to support unions that negotiate contracts in their plant. The auto company refused the UAW "agency shop" demand in Indiana—a state where union security is banned. Management insisted that to require union support by a non-union worker is a violation of his rights.

State "right-to-work" laws are part and parcel of the legal struggle over the agency shop—even though NLRB specifically avoided this issue in the Indiana ruling. It did so because that state holds such a clause as permissible under its own "right-to-work" law. Seven of the 19 states that have such laws have formally banned the agency shop along with all other forms of union security.

The Supreme Court is being brought into this union security argument with an appeal by the International Brotherhood of Teamsters. The Teamsters are asking the high court to reverse a ruling by Kansas officials that calls the agency shop not negotiable under Kansas "right-to-work" law. The Teamsters claim that the federal Taft-Hartley statute supersedes the state law.

Union security will also be fought on other fronts in 1962. Proponents of state "right-to-work" laws are seeking to extend their gains beyond the 19 states—either by the electorate or through state legislatures. A particular target next year will be the state of Oklahoma. Unions, on the other hand, will fight for repeal of the existing laws with a special campaign in Indiana. The Hoosier home is the most industrialized of the states that hold bans on union security agreements.

SEE LABOR RELATIONS CLINIC, PAGE 256

ANY MAN CAN WEED-PROOF 10,000 SQUARE FEET IN TEN MINUTES...with UREABOR®31

Get lasting protection from weeds and grasses this easy low-cost way

A SPECIAL SPREADER simplifies and speeds the UREABOR 31 applications at low rates with accuracy. Spreader holds enough UREABOR 31 to treat 1250 sq. ft. without refilling; weighs a mere 6 lbs. Width of the swath can be adjusted.

STANDARD PACKAGE IS 50 LBS. UREABOR 31 is packed in multiwall paper sacks for easy handling—easy storing. A convenient package, easily disposable, for spotting at predetermined intervals to facilitate large-area applications.

UREABOR 31 IS 3 HERBICIDES IN 1 The plant-destroying powers of 3 proven herbicides are combined in this granular mixture of sodium borates, substituted urea, and trichlorobenzoic acid to yield fast, long-lasting, nonselective results.

UREABOR 31 is a special weed killer for industrial grounds. It lowers maintenance costs... protects property... and improves appearance. UREABOR 31 is effective on a greater variety of weeds and grasses than any other herbicide now on the market. A single dry application gives year-long control! Yet it takes only 1 to 2-lbs. per 100 sq. ft. to do the job! As a granular material, UREABOR 31 is always ready to use... and safe to handle. It's a big time saver too... any man can easily weed-proof ground at the rate of 1,000 square feet per minute.

Write for literature now!

U.S. BORAX

630 SHATTO PLACE, LOS ANGELES 5, CALIFORNIA
3456 PETERSON AVENUE, CHICAGO 45, ILLINOIS
4028 CORONADO PLACE, OKLAHOMA CITY, OKLAHOMA

For more facts Circle 459 on Reader Service Card

DISTRIBUTOR DAN, the SKF bearing man, offers

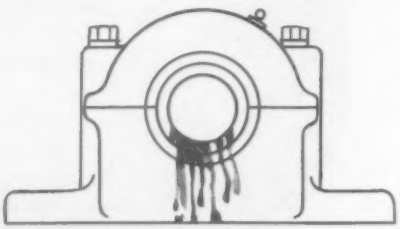
FIVE TIPS ON BEARING LUBRICATION

—that can save time and trouble for you

WHEN TO RE-LUBRICATE? Always follow the manufacturer's directions, if they're available. Most bearings, whether oil- or grease-lubricated, need cleaning and re-lubrication once a year. Re-lubricate oftener if the bearing is large, operates at high speeds or temperatures of 120-140 F. or higher.

WHAT GREASE CAN TELL YOU. Grease itself can tell you when cleaning and re-lubrication are needed. Dark grease means that oxidation has started or that abraded particles are present. Changes in the original color indicate water. Grease of a hard consistency should always be replaced.

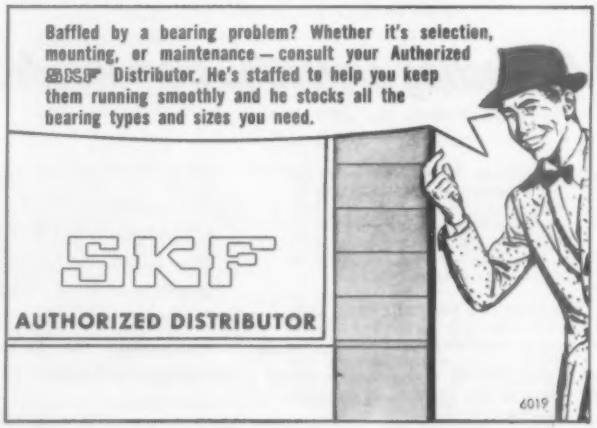
WHEN TO CHANGE OIL. Compare the oil in the bearing with unused oil. Clouded oil indicates water. Dark oil frequently indicates sediment. Dark, pitch-like coatings on the rings, roller ends or cage mean the oil has become dirty or begun to carbonize. So, clean the bearing and housing and re-lubricate.



TOO MUCH IS WORSE THAN TOO LITTLE. Don't overlubricate. Only grease that actually contacts the bearing lubricates. Using too much grease may cause churning and lead to overheating and loss of lubricant. Remember: the higher the speed, the more sensitive a bearing becomes to excessive lubrication.

CLEANLINESS, FIRST AND LAST. Clean new oils and greases will usually force-out old lubricants in the bearings. But they won't if the lubricant is badly oxidized. Pour a hot aqueous emulsion into the housing. Rotate shaft until bearing is clean. Drain solution while rotating shaft. Then, flush with hot light oil, drain and add new lubricant.

Baffled by a bearing problem? Whether it's selection, mounting, or maintenance — consult your Authorized SKF Distributor. He's staffed to help you keep them running smoothly and he stocks all the bearing types and sizes you need.



SKF MOTION ENGINEERING

Advanced ball and roller bearing technology

Fifty years of better management

In the fall of 1911, Frederick W. Taylor capsulized the goal of scientific management. He said, "It has for its object **increased output per unit of human effort."** Today, 50 years later, those of you who practice management and engineering of plant operations can have no better objective. Despite periods of automation-influenced unemployment, "increased output per unit of human effort" still stands as the concrete expression of a sound moral and philosophical objective.

It short-changes better management, however, to imply—as so many laymen do—that all it encompasses is the achievement of greater output through effective mechanization. Better management involves much more. Among its many beneficial parts, it includes better work scheduling, which enables man to use his time more fruitfully. It exercises careful control of raw and finished inventories, which conserves our natural resources. And it depends upon dynamic integration of group effort, which makes human relationships more rewarding.

But now the time has come for management to examine three significant changes its efforts have brought about:

1. **Change in our national economy.** While manufacturing still provides the biggest chunk of America's Gross National Product, the wealth—and leisure—that it creates has spurred the much-needed growth of the nation's service industries.
2. **Change in the rate of capital investments.** Productivity goals have pushed a towering rise in dollars invested to supply workers with modern tools.
3. **Change in the nature of manufacturing employment.** Engineering, administrative, technical, and clerical help has replaced the blue-shirt labor force at a rate that almost matches productivity gains.

How do these three changes affect plant management and engineering today? In many ways, obviously. But in three ways in particular:

First: Management must not be distracted from its task by periodic public hysteria about automation and its effect upon unemployment. Over the long haul, the United States can have few better objectives than the creation of wealth, leisure, and rewarding work through the attainment of higher output per unit of human effort.

Second: Management must now, more than ever before, concern itself with better management of machinery and materials. It is expensive machinery, rather than labor, that must be kept productive. It is costly goods, rather than energy, that must be conserved.

Finally: Management must abandon its traditional concept of "indirect costs" accounting. Apportioning overhead on the basis of direct labor input has become almost meaningless. Worse still, it obscures the dangerous drain that indirect costs are placing upon productivity improvements.

All three of these new challenges to plant management are inseparable from the specter of rising indirect charges. For this reason, FACTORY directs the next 70 pages to the "attack on indirect costs."

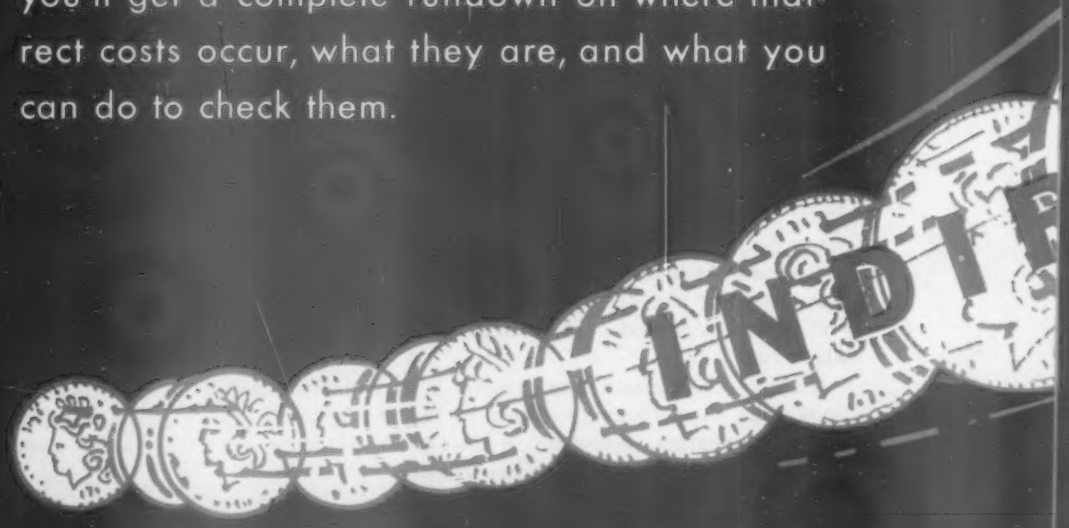
L. R. Bittel

EDITOR-IN-CHIEF

YOUR TARGET FOR 1962

$50 Billion in 1962

That's the shocking size of the indirect costs target in the manufacturing industries. While direct costs have remained constant since 1950, "non-productive" costs have gone up by half. Today, they chew up 33¢ of every $1 plant management has to spend. On the following pages you'll get a complete rundown on where indirect costs occur, what they are, and what you can do to check them.



DIRECT

1950

TACK
COSTS
COSTS
RATE OF GROWTH
1962

Wherever you work—indirec

Interviews, plus Department of Labor statistics, testif*

"As is the case with most firms, we have been experiencing a generally upward trend in indirect costs," Fletcher Byrom, president, Koppers Company, Inc., Pittsburgh.

Statistic: In petroleum refining, between 1947 and 1958, total output and non-production workers rose 40% while production workers actually decreased 10 to 15%.

"Technology of manufacturing is changing. There is a shift in emphasis from direct to indirect productivity and costs," James Keough, vice president, manufacturing, Fenwal Inc., Ashland, Mass.

Statistic: In non-electrical machinery plants, productivity rose steadily to 28% by 1958. But number of production workers rose only 10%. The 50% rise in non-production workers did not prevent output from rising 40% in just six years.

"Despite constant attention, indirect costs still account for 25% of the sales dollar," Rockwell Manufacturing Company, Pittsburgh.

Statistic: In lumber and wood products plants, there was a 25% loss in number of production workers. Non-production workers increased 8% during same period.

Statistic: In rubber and plastics, output increased only 30% in the 11 years ending 1958. It required no additional production workers for this modest growth. But non-production workers were up 20%.

"Our company faces the challenge of getting overhead back into line. Forty per cent of our 10,000 employees are indirect. This is a larger percentage than it was five years ago," controller, major aircraft builder.

Statistic: In textiles, number of workers decreased 30% between 1947 and 1958. Non-production workers stayed about the same. Rate of return on stockholders' equity dropped from 16% after taxes to 4%.

"Cost of information handling of all kinds is 15% higher than it was 10 years ago," vice president, production, eastern box plant.

Statistic: The stone, clay, and glass industry followed a familiar pattern: no increase in production workers but a 50% increase in non-production workers.

"At present all our buildings are multi-story, and material handling costs have increased over the years," vice president, major optical company.

Statistic: In primary metals, number of production workers stayed the same while non-production workers increased by 50%. The industry output rose 35% but fell back with each successive recession.

costs are on the rise

o the weed-like growth of indirect manufacturing costs.

"Indirect costs usually represent the greatest potential in plant operations because they have been subjected to the least control," Donald Wheeler, director of industrial and plant engineering, Grayson Controls Division, Robertshaw-Fulton Controls Company, Long Beach, Calif.

Statistic: In the paper industry, growth in production workers was low—only 14% between 1947 and 1958. But output rose four times as fast—up almost to 60%. Non-production workers increased even more—70%.

"If my product costs two dollars instead of one because my company is supporting an overinflated bureaucratic organization, I can be as sure as the setting sun that my competitors will drive me out of business unless I can find some way to produce equivalent quality at greatly reduced overhead," H. G. Ebdon, president, Combustion Engineering, Inc., New York.

Statistic: Chemicals was the biggest growth industry in the last decade, with output doubling. But production workers showed no increase, while non-production workers went up 76%. Increase in output with same number of production workers stems from tremendous investment in new and automatic equipment.

"Despite continual reductions, there has been a slight, but persistent creep upward in indirect costs over the last three years. This increase has been about 10 to 12%," plant manager, 1000-man business machine plant.

Statistic: In plants manufacturing electrical machinery, greatest increase has been in non-production workers—75%. Production workers went up only 35%.

"While the proportion of people engaged in direct production has fallen steadily in the last 50 years, the percentage of people in overhead and other indirect tasks has risen sharply," Robert F. Steadman, vice president for manufacturing research, American Management Association, New York.

Statistic: In food plants, production workers decreased 13% in 11 years while non-production workers increased 26%. Almost one in three workers are now in non-production jobs.

"Like most companies, our fringe benefit per cent of total employee compensation has increased significantly over the last nine years," vice president, finance, greeting card manufacturer.

Statistic: In apparel trades, there was no decrease or increase in production workers, but a 20% increase in non-production workers.

Statistic: In tobacco converting plants, production workers fell 25%, while non-production workers rose 23%.

*Statistics cited are for period 1947 to 1958, derived from "Trends in Output per Man-Hour, in the Private Economy, 1909-1958" Bulletin No. 1249, U. S. Department of Labor, September 1960.

The 10 critical areas of INDIRECT COSTS

Indirect costs are the "sleepers" in the manufacturing budget. Sometimes they are innocuous, like the cost of paper towels in the men's room. Sometimes, they are elephantine, like the maintenance and repair bill. But for decades, management has been able to tuck most of them under the elastic blanket of "burden" or "overhead." Now, however, the quiet consumer revolution against high prices and indifferent quality has dragged the problem of indirect costs out into the daylight.

Awakening plant management everywhere now looks to reduction of indirect costs as the means for relaxing the profit squeeze. Indirect costs, of themselves, are neither bad nor good. While they don't often "add value" to the product in the strictest sense, they are essential to modern manufacturing operations. Consequently, indiscriminate cutting of indirect costs is unwise.

The problem for plant management and engineers is to ascertain which indirect services truly pay their own way—which ones provide the leverage for increased productivity of the total organization. These worthwhile services should be retained and improved. Other services, which are wasteful, should be removed.

On the following pages FACTORY's editors have identified those ten indirect services which we believe make the sharpest impact on the total manufacturing effort. These ten may not include every indirect charge. They may include some that you judge to be unimportant. And some charges we identify as "indirect" may be "direct" charges at your plant. But regardless of definition, these ten will become industry's most attractive cost-cutting targets in 1962.

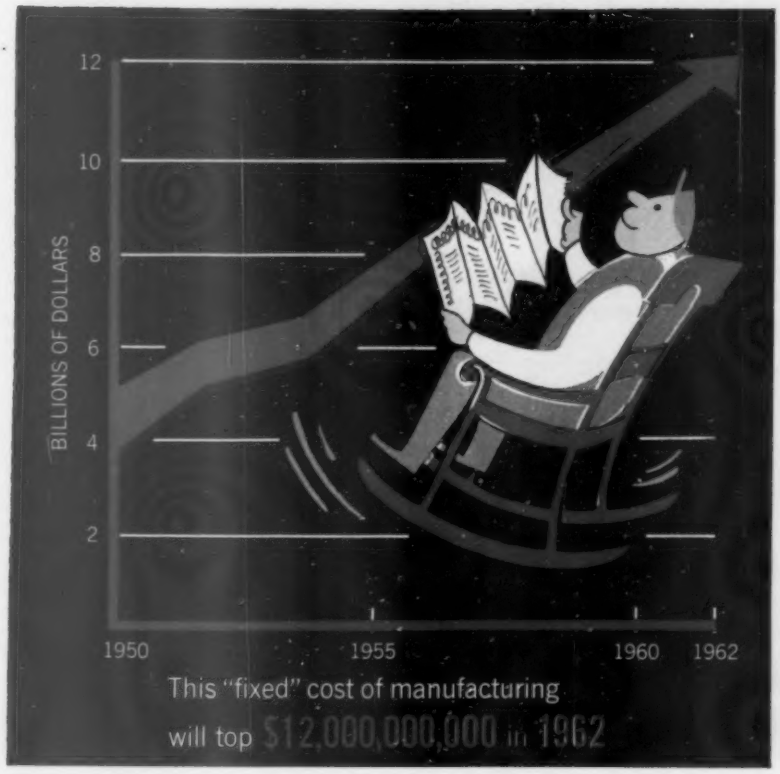
Note: Statistical sources for charts are listed on page 284.

HOUSEKEEPING

"Housekeeping is an expense that can get completely out of hand if not tied to your normal day-to-day operations."—C. V. Swank, vice president, Johnson & Johnson.

Housekeeping: Labor, equipment, and supplies used to clean buildings, machinery, work stations, grounds. Disposal of production wastes and rubbish. Sanitation, snow removal.

Involves 1.7% of all employees. Costs National Biscuit, for instance, 1¼% of gross sales dollar and General Electric, 45¢ per square foot annually to clean floors; average plant, $20 per employee to maintain washrooms. One study shows a 14% cost reduction achieved by better methods, 58% by better organization. Institute of Management Sanitation estimates 25% or more waste in most housekeeping efforts.



EMPLOYEE SERVICES

"Employee services have been sharply on the rise since World War II."—Vice president, major optical company.

Employee services: Cafeterias, discounts, tuition refunds, service awards, insurance, pensions, social security, unemployment compensation, paid vacations, holidays, rest periods, recreation programs.

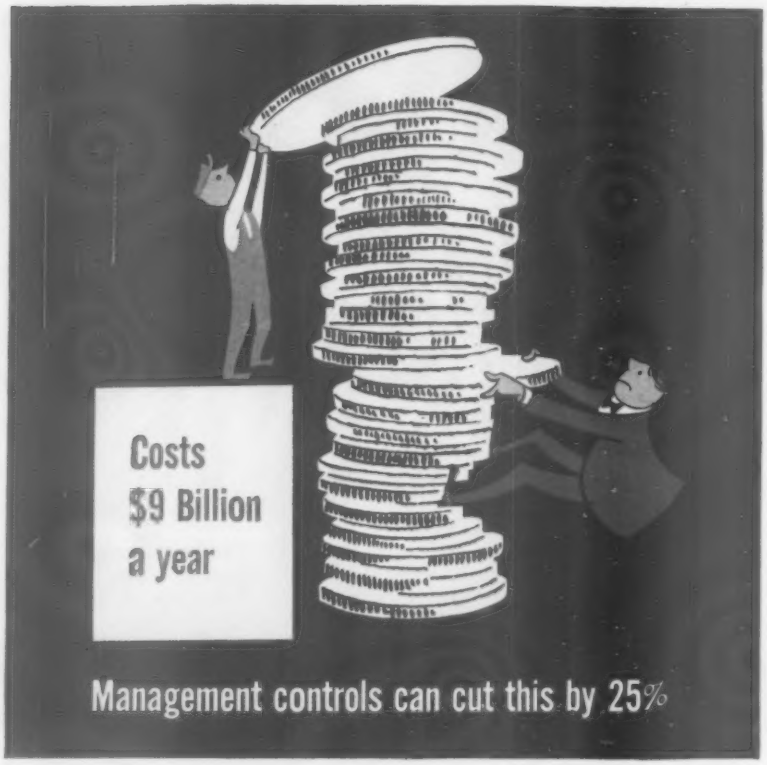
Employee benefits and services range from 18 to 25% of payroll, says U. S. Chamber of Commerce. Grew from 17 to 25% of payroll at Du Pont since 1951. Were reported up 45% in last 10 years by famed paper cup manufacturer. Problem: To get more productivity from committed dollars.

MAINTENANCE

"Since 1940 our maintenance labor has increased twice as fast as all other wage rolls. Today maintenance consumes 20¢ more of the operating dollar than it did 10 years ago."—Ollie York, manager, maintenance engineering, The Du Pont Company.

Maintenance: Upkeep and repair of plant buildings, grounds, facilities, and equipment. Also engineering of equipment and facilities installations and modernizations.

"Of all indirect costs, maintenance has one of the biggest appetites," says plant manager of Ford Motor Company's Wixon, Mich., plant. But management cost controls can save 25%, according to consultants Cresap, McCormick, & Paget. *Caution:* "Chopping cost of maintenance may not be the answer to reducing *total* cost or gaining productive downtime," Food Machinery Corporation.

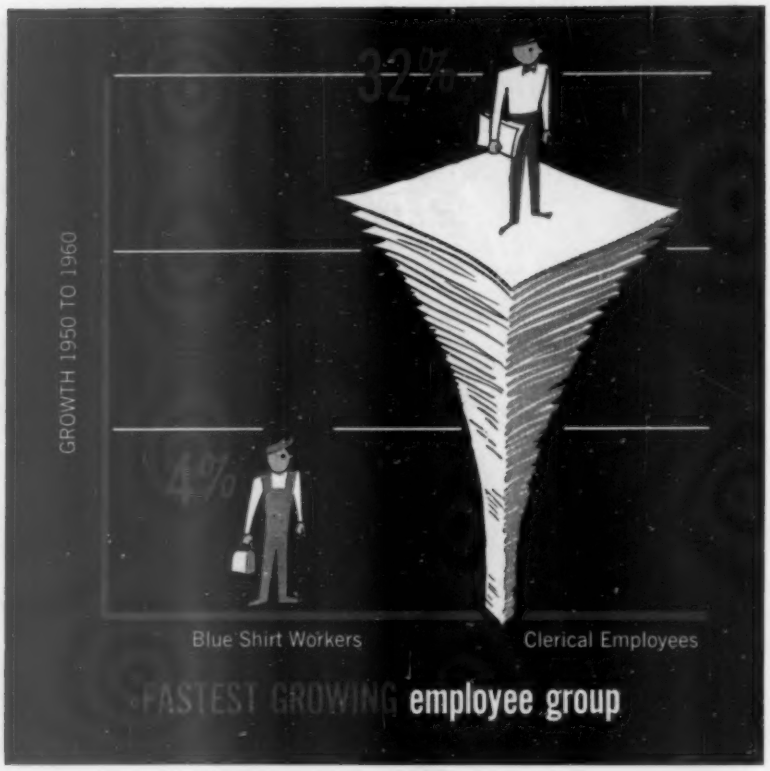


MATERIAL HANDLING

"In recent years, emphasis and education has held material handling costs in check. Their portion of sales costs has been relatively constant. But management should not relax. In most cases there is still room for another 25% or more improvement."—R. K. Hopkins, Jr., general chairman, technical services division, American Material Handling Society.

Material handling: Labor and equipment to move materials and products from receiving through manufacturing to shipping.

FACTORY's material handling survey in Atlanta last year put material handling costs at 15 to 20% of manufacturing costs. This was a drop of from 5 to 10% of the figures usually cited. Recent interviews confirm this impression.



PAPERWORK

"Money spent on paperwork and information handling has gone up 200% since 1955."—Controller, nationally known hardware manufacturer.

Paperwork: Record keeping of all kinds. Memos, letters, and reports. Information handling by machine or computer. Includes cost of labor, equipment, and supplies.

According to U. S. Bureau of Labor Statistics, clerical employees were smallest single white-collar group in 1900; by 1950 one out of every three white-collar workers was a clerk. At General Electric, for instance, white-collar workers jumped from 25% to 50% of the work force between 1942 and today. The American Management Association observes, "We need, but do not have, work standards for output in this group as we have for production workers."

PLANT PROTECTION

"Controlling security costs is as much a function of getting the most protection for the dollars available as it is of keeping the lid clamped down on the number of dollars to be spent."—Charles E. Hayden, security manager, Philco Corporation (Palo Alto, Calif.).

Plant protection: Protection of property, personnel, and information from fire, theft, vandalism, accident, storm, disaster. Includes security and safety devices and equipment, guard forces, and insurance.

Quite aside from loss by theft, work accidents cost industry $4.2-billion yearly. Thus, savings potential is high here. One plant cut insurance costs 90% with a sprinkler system. Another cut its guard force 50% with an automatic fire and burglar detection system.

QUALITY CONTROL

"In our company, quality control costs have doubled in the last few years."—Executive, Whirlpool Corporation.

Quality control: Inspection (some companies charge this to direct labor accounts), test, statistical quality control, rework, labor, equipment, supplies, and supervision.

Famous QC authority, A. V. Feigenbaum (General Electric), is the authority for statistic in the cartoon. He says inspection and test take only a small percentage of total quality costs. Says 50% of failures are those of organization, not technique, and predicts that total cost can be cut by one-third.

STAFF SERVICES

"Staff services have a horrible way of increasing. They are some 30% higher now than they were 10 years ago."—Vice president for production, major paper converting company.

Staff services: Production and inventory control, industrial engineering, manufacturing engineering, personnel and community relations, budgeting and cost control, and other plant administrative costs.

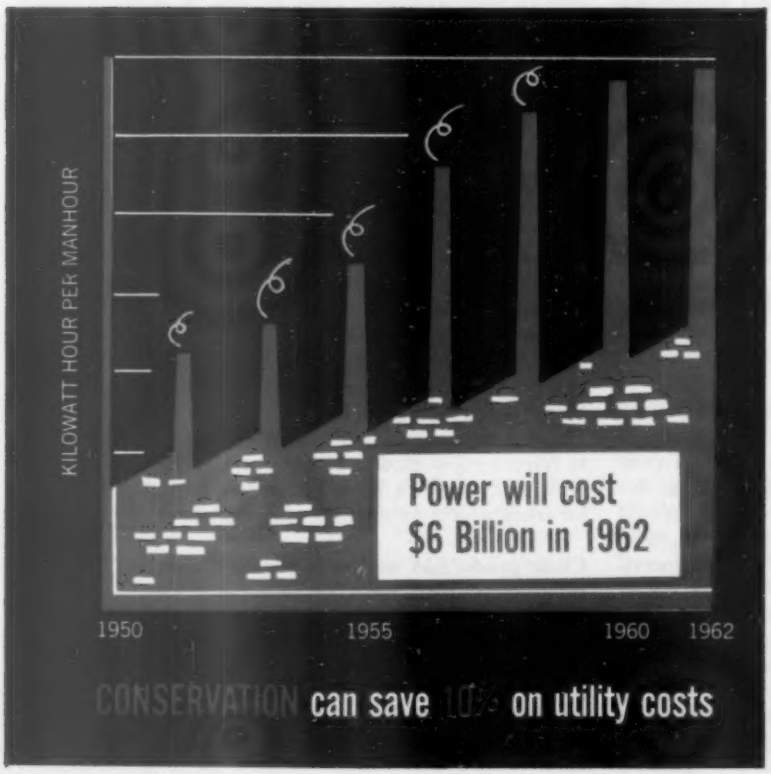
A FACTORY survey in April of this year showed that of 31 companies, 26 were trying to hold the line or wield the ax on staff groups. Five companies were still building in the belief that top-flight staff service is the key to higher profits.

TOOLS and SUPPLIES

"Next to salaries, the largest single account in our plant's overhead is factory supplies."—Controller, large West Coast aircraft plant.

Tools and supplies: Small tools, storeroom small parts, maintenance supplies, wiping rags, degreasing compounds, solvents, lubricants, cutting tools, shelf goods, grinding wheels, storeroom operation, etc.

These costs yield both to conservation and to imagination. Standardization, for instance, will enable Sperry Gyroscope, Great Neck, L.I., to pare its $4-million budget by 20% this year. Westinghouse is looking into the possibility of saving solvent costs by the use of water-base paints. Other companies are instituting tool control programs, and experimenting with new tools and materials.



UTILITIES

"As we achieve a reduction in total man-hours per unit, utility costs per unit also drop. But as a portion of total manufacturing costs, utilities are on the rise."—Manufacturing vice president, leading eastern canned goods firm.

Utilities: Distribution, utilization, and metering of electrical power, gas, water, and compressed air. Plant heating, ventilating, air conditioning, lighting, and communication systems. Fuel, steam, water conditioning, effluent treatment, and sewage facilities.

Although some chemical processing plants apportion utility costs directly to the product, most plants regard them as overhead. Employee productivity is dependent upon greater power input so power and utility usage will continue to grow in regard to other manufacturing costs.

THE ATTACK ON HOUSEKEEPING

Housekeeping is expensive to perform, but exorbitant to ignore. How do you stand?

Floors are the biggest natural collector of dirt. Which floors cost *you* more per square foot to clean up? ☐ Production areas? ☐ Washrooms? ☐ Offices?

Have you evaluated use of mechanized floor scrubber-sweepers, vacuum cleaners, floor polishers? Considered epoxy or urethane coatings to reduce dust and extend life of floor? Is there enough illumination to show dirt? Are floors clear of obstacles for easy cleaning?

Is it necessary to disinfect washroom, toilet, and locker room floors daily? Would a stronger disinfectant save man-hours? Is there a floor-cleaning schedule? Should you allow the same time to service carpeted, wood, and concrete floors?

How would you rate your floors? ☐ Good enough to eat off? ☐ Shipshape? ☐ Spotted with oil, rags, papers, and cups? ☐ Downright dirty?

When modernizing or building a new plant, can you design for low-cost housekeeping? Use concrete floor hardeners at heavy traffic areas. For hose-down areas, keep working area and passageway high points with a minimum slope of ⅜ inch to drains. Set lockers on curbs. Hang toilet fixtures on walls. Consider open grating of stainless or ceramic-coated steel, or magnesium at entrances to catch snow, rain, or dirt.

Walls can be junk collectors. Do you find disorganized shelves, bulletins, pipe chases, clothes hooks, and a cheese-cake pin-up gallery? Would you conduct a visiting woman stockholder through your plant today? Do your outside walls sweat? Is mold growing? Would preventive insulation be justified?

Would walls resurfaced with glazed tile or impervious paint pay off in two years in reduced cleaning costs? For process areas subject to fumes, dust, and vapors, should ceramic tile be used? Has improper calking allowed dust and water penetration around doors and windows? Has area illumination been reduced because of dirt on walls? Is it time for a paint job? What type and color is best for housekeeping, lighting, morale?

Windows permit lowest-cost lighting when clean. Do you clean your windows once or twice a year? More often? Are at least 30% of them never touched because they are completely inaccessible? In plant expansions, do you need windows at all?

Ceilings house your utility lines and services. When is best time to service without disrupting production? Day or night shifts? To cut ladder handling time, is your forklift truck available? Does it reach the ceiling? Could a portable vacuum cleaner be used up high? Any temporary wiring to obstruct cleaning?

Roofs are giant waste and rubbish collectors. When did you last declog drains and downspouts? Would mesh covers prevent this condition? Are leaks near roof-mounted equipment? Check for loose bolts that permit vibration.

Grounds costs can skyrocket unless planned for. Is it best to hire an outside contractor for year-round grounds keeping, at a fixed expense? Can you depend on an outsider for emergency service? If you can't justify outside service, could you justify mechanized equipment to cut grounds-keeping labor costs? How many production days did you lose to snow last year? Do you use manual labor with shovels? Would it pay to have a snow-plow attachment on company vehicles? How much does a snow-melting system cost installed for truck access to shipping and receiving?

Clean production machines reduce downtime. Do you program your machines for cleaning as well as maintenance? Which first? Is your maintenance mechanic paid more than a cleaning serviceman? Would you save at least 30% of the mechanic's time if he could repair a clean machine? Could you train the operator to be neat in his work and eliminate unnecessary clean-up?

Has the amount of dust in certain production areas

increased? Vibrating or loose machinery can create dust. Tighten hold-down bolts. Check new vibration pads.

Do you clean the V-belts on machinery every 6-8 months? Could you afford a more expensive wear-resistant paint to extend life of machine surfaces? Have you considered light colors to show up dirt and grease better?

Excessive fixtures reduce production area. How many extra tables, racks, benches, and cabinets are there around each machine tool? Is there a rat-maze course to the control stations? Can you reach under or behind the machine? Are gauges and jigs just lying around? Any assigned storage space for tie-down "T" bolts, clamps, wrenches? How long do old unused machines stay on the production floor?

Lubrication, uncontrolled, creates cleaning problems. Any lube-oil line leaks? Is there a catch basin or a piece of sheet metal under the machine to contain lube oil, dirt, and wastes? Will wet-type vacuum cleaners cut cost of basin sludge cleaning? What happens to used lubricating oil? Down the sewers? Or reclaimed for cost savings? Does your lube man create more clean-up work by over-lubrication? Do your overhead cranes drip oil?

Production materials in plants should flow freely. Do you contain the flow pattern by properly marked aisles? Have you allocated areas of temporary storage in correct locations? Are they adequate? A catch-all? Can a man clean these areas easily? Is full advantage taken of the cubic space? Are parts clean, accessible, and marked? Could orderliness reduce standard time allowed for "finding work" and "move to machine" for an operation? What happens to rejected work? Does it sit around waiting to be released by a foreman or inspector?

Production wastes can be controlled. Are valuable wastes separated, classified, and cleaned? Is the market value rising or falling? Does it pay to install equipment to prevent wastes from reaching the floor? Are enough scrap bins available and located properly for efficient use? Does the scrap pile grow, stay the same, or decrease?

In process plants, is there a by-product use? Can it be burned for plant Btus.? Does your process create excessive dust as food powders, grinding and polishing, cement, lumber? Actually, what is the visibility in these areas? Have you considered dust pick-up at the source, such as at mixer and filling machine openings? Could salvage dollars pay for installation?

Rubbish can be buried, burned, or carted away. Any local ordinance on burning? Outside hauling contractor? Is your loading dock blocked with barrels of rubbish? Could you save money and production space with your own incinerator, or compactor-baler? By using your forklift truck during off-hours, could rubbish handling costs be reduced? Any special dump-type containers available for use with your forklift?

Yard storage can be the start and end of material flow. Do you rely on one person's memory to locate parts? Would a yard layout or a grid system help organize things better? When a shipment arrives, is it located in a planned section or dropped in the first empty spot?

Housekeeping service worker needs recognition. Can this type of job be upgraded and morale improved by establishing a table of organization: trainee, second class, first class, group leader, foreman? Is merit recognized by promotions? Is the individual work load balanced? Has each worker a layout of his work area? Is there a proper instruction sheet outlining the work he has to do? Is his work checked? Do you provide a uniform? Do you let him initial his tools? Are his tools adequate? Is he used as an emergency laborer for non-housekeeping work?

Work station neatness reflects individual efficiency. Is a coat on a nail? Lunch box on window ledge? Are wiping cloths, gloves, and rags draped on the machine? How close is waste container? When you permit smoking on the job, do you furnish metal containers for butts? Do operators keep their immediate areas clean when time is available between machine set-ups or process cycle time? Is the nature of plant work such that it pays to have a service worker clean operations area? Is a clean-up period allowed at end of day? Do employees use time properly or are they with some of the boys at the time-clock count down? Does "personnel" orient new employees to the "home away from home" spirit?

Personal property cuts valuable process area. Ask when tools and supplies are needed. ☐ Now? ☐ Tomorrow? ☐ Next week? ☐ In the future? Is there a tool check-list for a job classification?

When were workers' lockers last inspected? Are you prepared to collect nuts, bolts, pencil stubs, old shoes, bottles, cigar butts, and rejected parts?

Supervision: a key to your housekeeping success. Is responsibility clearly assigned? ☐ To plant engineer? ☐ To plant manager? ☐ To sanitary engineer? ☐ To housekeeping supervisor? ☐ To individual foremen?

Does the supervisor inspect regularly and use a housekeeping rating sheet? Do department foremen cooperate in keeping areas accessible for cleaning? Will they reprimand their own men for poor housekeeping?

Programing channels housekeeping for efficiency. Does your program include at least: (1) a survey of the plant establishing minimum standards, (2) a workable, balanced schedule, (3) training courses for service workers, (4) inspection procedures? Will work sampling or measurement be effective in cleaning functions? Would the added expense of a consultant in setting up the program cut costs in the long run?

Plant design aids can reduce man-hour costs. Check how far a serviceman walks to his supply cabinet. Would different location cut walking time? How far to water closet, electric outlets, rubbish storage? Would pipe columns and floor flanges, rounded machine corners, tiled washroom floors be easier to keep clean? Would non-skid metal floor plates at heavy traffic points and freight elevators ease floor-cleaning problems? Is housekeeping effort considered when you lay out a new production area? When you buy a new machine tool?

19 ideas for cutting housekeeping costs

A little cash (spent on quick-payoff equipment or materials) can work wonders in some places. In others, you don't need a penny to cut costs.

IDEA NO. 1—FLOORS. To cut floor-mopping time, use portable heating elements in buckets. At water temperature of 150 F. oil and grease clean-up is faster.

Wet-mop with a detergent-germicide. Damp-mopping is ineffective for bacteria-killing action in washrooms.

Oil-modified urethane coating can dry in 30 minutes while alkyd clear varnishes can take 6 hours. Quick drying time pays off in fewer production interruptions. Urethane coatings are hard, resist chemicals and wear. Frequency of application can be cut at least one-third.

A mechanical sweeper covers 50,000 square feet/hour in aisles. Manual sweepers should push into aisles.

Wet-type vacuums clear plugged floor drains fast.

IDEA NO. 2—WALLS. For easy cleaning, resurface old washroom walls with plastic finished panels or apply water-resistant coating.

Newer synthetic rubber-base sealants last longer in keeping dust from entering doors and window frame.

Anti-sweat insulation once had to be cut and fitted by hand. Now, urethane chemicals are applied as low-cost rigid insulation foamed or sprayed in place.

IDEA NO. 3—WINDOWS. New window cleaner solutions can save up to 15 minutes wash time per window. Accessibility to both sides of window from within cuts preparation time. In new facilities, consider reversible pivoted windows for one-side servicing, double-panes for dust-free areas, and plastic sheets where glass breakage is a problem.

IDEA NO. 4—CEILINGS. In large plants, with a lamp cleaning and maintenance schedule, consider portable light-fixture cleaning tanks containing a detergent wash and rinse compartment. These cut labor cleaning costs.

For high-bay lights inquire about hangers that can be disconnected and lowered for easy access. Choose self-cleaning fixtures for unavoidably dusty areas.

In new installations, select the fewest number of fixtures consistent with eye comfort and production requirements. Fewer fixtures require less cleaning and bulb replacement. But provide high light levels in washrooms, toilets, and storage areas to show dirt.

If given a choice of ceiling rafters for low-cost cleaning, select I-beams rather than fabricated trusses.

IDEA NO. 5—ROOFS. Standing puddles can result in excessive water leak damage. First try squeegeeing to roof drain. If volume is large, consider a wet pick-up vacuum to convey to drains or gutters. Best solution, if economical, is a properly sloped roof to drains.

IDEA NO. 6—GROUNDS. Grass can prevent costly soil erosion. To cut labor of watering lawns, convert outside fence rails into permanent sprinkler system.

For weed control of your railroad siding, consider coating track area with waste oil.

When sizing drainage system, check U.S. Weather Bureau reports for maximum rainfall in your area.

Provide a narrow strip of crushed rock around perimeter of plant to cut mud spattering of outside walls.

Clean hard-surfaced employee entrance walks, minimize track-in dirt. Mechanical moving brush and gelatin-type mats remove dirt from shoe bottoms.

IDEA NO. 7—GENERAL CLEANING. For dust control, design air flow movement downward. Eliminate dust catchers through recessed fixtures and concealed horizontal members.

Control your washroom and toilet labor costs by referring to soap and detergent expenses as a gauge. If percentage of solution material to total cleaning costs is less than 5%, your labor cleaning expense is too high.

Design for minimum repainting. Evaluate proper application for glass, plastics, stainless steel, ceramics.

IDEA NO. 8—PRODUCTION MACHINES. Steam cleaning with proper detergent does a better and faster job of machine housekeeping. However, care must be taken not to steam out lubricants.

Instruct employees not to use machine sumps as garbage containers for food wastes, papers, cigarettes.

Dirt is seen better on machines painted a light color.

A new waterless detergent is now available to clean motors efficiently without creating short circuits.

For inaccessible motors, provide dust pick-up hoods.

IDEA NO. 9—EXCESS TOOLS AND UNUSED MACHINES. Dow Chemical Company's salvage policy is "any operations not self-sustaining or showing a profit are discontinued." Its salvage program is continuous. When equipment is non-productive, it is moved to the salvage area for sorting and classification. If salvagable, the piece is cleaned, repaired, placed in a designated location, and a record made of its history and location. Items are listed on "Records of Reclaim" and circulated to all departments. This list is periodically updated and slow-moving items reclassified as scrap.

In a Blaw Knox machine shop, racks were built for bolts and clamps. In its foundry, roll chills are stacked by size. Both illustrate good housekeeping orderliness and have saved tool hunting time for particular sizes.

A scrap committee acts as an inspection team by asking specific questions; such as: Is it in production use now? If not, how long in this location? After an inspection, one plant manager found a 10% floor area saving. He closed a branch plant, and coordinated all facilities in one plant, without pushing out walls.

IDEA NO. 10—LUBRICATION. Over-lubrication creates housekeeping work. In food plants, this can foul equipment and contaminate foods. Install centralized lube systems to reduce waste of over-lubrication, cut down on manual lube labor, and minimize the chances of missing lube points. For overhead equipment, provide catch collectors for dripping oil.

Scrap dealers pay you for the weight of metal only. Lube-oil reclaiming to them is a dividend. There are various means to help salvage oil. In brass mills, hydraulic briquette machines compact brass chips but also extract lube-oil. Oil centrifuges separate oil from metal efficiently. One company designed and built a scrap yard like a giant drain to separate by gravity. The yard is pitched 1/20 to the center.

IDEA NO. 11—PRODUCTION MATERIALS. For temporary storage, place production materials in skids, racks, or holding conveyors—not directly on floors.

Make use of vertical storage height by interlocking bins and containers, drive-through storage racks.

IDEA NO. 12—PRODUCTION WASTES. Three rules for cutting waste costs: (1) know the market; (2) keep waste clean at its source; (3) handle it efficiently.

Consider a by-product use. Wastes of a brewery process are sold to pharmaceutical firms for antibiotics.

Consider vacuum pick-up near cutting, grinding, or filling operations.

Magnetic rotary drums continuously separate foreign metallic objects. Payoff is usually less than a year.

In pattern shop and furniture factories, good scrap wood housekeeping lowers insurance premiums.

IDEA NO. 13—RUBBISH. Cut cost of moving heavy cans to central plant area by using large disposable paper insert bags. Consider color coding to ensure regular return of empties to individual departments.

Some plants prefer their own incinerators. One said, "It used to cost us $3 to sell paper worth $1."

When paper towel costs rise, check whether employees are taking towels out of washrooms. Possible solution—electric hand-dryers.

IDEA NO. 14—YARD STORAGE. Cut hunting time with yard controls. Lay out a grid yard system. Record location of every item. Leave room for handling equipment. Use "First in, first out" system for raw materials.

IDEA NO. 15—INDIVIDUAL EMPLOYEE. Educate the employee on keeping his work station in order. Do not allow him to spill over with personal property. On U.S. atomic subs, sailors are allowed only 3 cubic feet to store personal property. On the job, a worker's property should be contained in a small area.

To cut down on dirty and disorderly locker rooms, some plants close this area during working hours.

Post photographs of poor housekeeping on bulletin boards. Show before and after shots, when possible, to encourage individual accomplishment.

IDEA NO. 16—SUPERVISION. A simple box score rating sheet will help the cleaning supervisor pinpoint violations when he inspects departments. Provide a clear-cut point score system that weighs the relative importance of floors, walls, equipment, etc., for departmental comparisons. Post on bulletin boards. Run a contest, award booby prizes, or issue "summonses."

IDEA NO. 17—SERVICE WORKERS. Continually upgrade training of service workers in (1) proper technique, care, and use of equipment; (2) proper proportioning of cleaning materials; and (3) safety practices. Visual aids are available at the U.S. Public Health Service and Institute of Sanitation Management.

Give worker a daily assignment card with a mapped area of his work. Post his area rating to motivate competition and establish the individual's work pride.

IDEA NO. 18—HOUSEKEEPING PROGRAM. A program will succeed when follow-up is religious. Once installed, maintain the pressure.

Here's a seven-point program: (1) set quality standards, (2) improve cleaning method, (3) set time standards, (4) calculate the yearly over-all manpower need with a master cleaning list, (5) schedule work in balance, (6) train workers, (7) check performance. The master cleaning list should contain all cleaning operations for the year, estimated time per operation, and frequency per year for operations. This yields estimated hours per year to clean each item. Total yearly housekeeping costs and man-hours can then be forecast.

The U.S. Small Business Administration suggests certain area groupings for similar cleanliness quality standards: They are (1) executive offices; (2) work offices, washrooms, corridors, plant offices; (3) power house, gauge laboratory, test laboratory, locker rooms, storage, packaging areas, shipping and receiving areas; (4) production departments, maintenance shops; (5) basement, idle equipment stores, transformer rooms.

IDEA NO. 19—QUICK TIPS.

- Use pipe handrails also for compressed air lines.
- Use lockers with sloping tops to discourage catch-alls.
- In large plants, area cleaning supply stations save "make ready," "travel," and "put-away" time.
- Standardize on cleaning chemicals and tools for purchasing economy and simplified training.

How 12 plants attack dirt and disorder

FROM ACROSS THE COUNTRY, McGRAW-HILL NEWS BUREAUS REPORT...

• SEATTLE—By making 15 dust-mop cleaners at $9 each, Boeing Airplane Company reduced mop replacement costs by $7020 annually.

• WICHITA—Salvage of aluminum chips and shaving from milling machines saved another Boeing plant $428,200 last year. A specially designed underground flume system uses 80,000 gallons of circulating coolant liquid to convey chips from machines to storage bins at a rate of 12,000 gpm.

• DALLAS—Plastics Manufacturing Company saved $6000 by better supervision of porters' time. They now report to maintenance supervision, not to departments.

• CLEVELAND—For incoming carload shipments of cleaning fluids, Thompson-Ramo-Wooldridge, Inc., spent $20,000 to install an outside tank, extend a rail spur, buy a transfer cart. Reported payoff period—6 months.

• LOS ANGELES—MTM and work sampling save McCulloch Corporation $34,500 annually on janitorial labor and materials, including contract haulage of rubbish. Annual cleaning costs are now about $60,000.

THE DRIVE FOR LOW-COST CLEANLINESS

On Jan. 1, 1960, the Machine & Weld Section of General Electric Company's Ordnance Department (Pittsfield, Mass.) put into operation a housekeeping program to "superclean the shop at less cost."

P. K. Horton, the plant's general foreman, states that labor costs were reduced from $93,000 to $58,500, and scrap and rework were cut 12%.

A group of 15 service people, under one leader, cleans all machines, sweeps floors, and removes refuse on the third shift. Major aids to housekeeping were:

(1) Work-in-process pallet stack racks (photo, left), plus an in-plant phone, to deliver jobs to machines.

(2) A change from oil-based cutting fluid and coolants to chemical-based coolants. This alone saved $25,000 annually on cleaning labor and coolant replacement costs, as no sticky, hard-to-clean film forms on machines.

(3) Tool cabinets on wheels assigned to operators.

(4) Throwaway towels instead of cloth towels.

(5) Welding curtains mounted on movable racks.

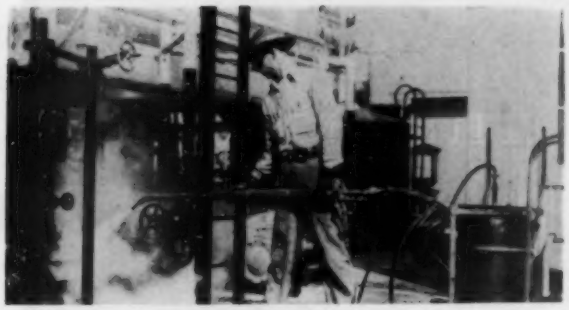
HOUSEKEEPING BECOMES A STATUS SYMBOL

At Raybestos Division of Raybestos-Manhattan, Inc. (Bridgeport, Conn.), W. "Doc" Hawley, chairman of the plant's housekeeping and safety survey committee points out the monthly department winner. The "Standings for Housekeeping" program has contributed substantially to the 12½% reduction of scrap loss in 1961.

A six-man partial rotating committee inspects and rates each department every month. A special award is made for the year's highest average.

A QUICK-RETURN INVESTMENT

Bower Roller Bearing of Detroit cut its floor-cleaning costs by 75% with a gasoline-powered mechanical scrubber. Previously, six servicemen were needed to clean a 26,000-sq.-ft. floor area. Now, one man with proper equipment covers the same area and does a better job. Estimated payoff period: 4 months.



STEAM BLASTS DIRT AND GRIME

At the Oleum (Calif.) plant of Union Oil of California, an employee steam-cleans refinery valves and piping. By a similar method, two men at Phillips Petroleum, Borger, Tex., service a large pump in 6 hours. Hand scraping used to take 60 hours. Total savings per cleaning: $80. And steam gets into the inaccessible areas.

WORK MEASUREMENT WORKS WONDERS

In its Philadelphia pharmaceutical facility of over 800,000 square feet, Smith Kline & French was faced with an all-time high in sanitation costs. At the same time quality was falling below desired levels. Outside specialists—Industrial Sanitation Counselors (Louisville, Ky.)—were brought in. They succeeded with a work standards program at a 20% over-all saving.

A major consideration was the establishment of cleanliness quality levels in all areas. An evaluation system assigned numerical values to degrees of cleanliness, order, and engineering for each element (floor, walls, ceiling, etc.) of a room. A predetermined code of rating values ruled out bias. Originally, quarterly ratings were made until quality increased. Now, frequency of rating areas has been reduced.

At the beginning, the total cost was 52¢ per square foot with a quality level of 69.2%. Work standards reduced this to 28¢. However, to improve quality, the company chose a higher cleanliness level of 85.7%. The program achieved this at an operating cost of 39¢ per square foot—still well below the initial cost figure.

It is interesting to note the departmental or area breakdown of cost per square foot:

Lockers & washrooms	= $.80	Cafeterias	= $.30
Production areas	= .30	Chemical spillage	= .40
Machine rooms	= .10	Sterile sections	= .50

Most of the cleaning was scheduled for a 5 p.m. to 2:30 a.m. shift. However, schedules were adjusted for heavy or light production seasons. In needed areas, pick-up or policing was done during break hours.

JUST WHAT THE CONSULTANT ORDERED

At Parke, Davis & Company's Detroit plant, consisting of 68 buildings spread over 1,839,000 square feet, management has effectively installed standards on sanitation work. It saved $37,000 the first year. This drug producer wanted uniform cleanliness, so it retained H. B. Maynard & Company, Inc., management consultants, to work out the program.

The nub of the problem, as Maynard's team soon found out, was the individual sanitary worker. Each one had a different method of dusting, washing, etc. Thus, a tailor-made methods training course was started. It was limited to six employees at a time in four-hour periods. Twelve basic daily cleaning operations from urinal cleaning to dust mopping were examined, explained, and correctly demonstrated. Each worker repeatedly performed the operations until he became reasonably proficient. Upon completion of the course, detailed, easy-to-understand guides were supplied to each employee for future reference. These included infrequent cleaning assignments such as lamp washing and sealing floors.

With properly trained workers and established quality levels of cleanliness for all areas, standards applied used a modification of Universal Maintenance Standards (FACTORY, November 1955, page 98).

Management had "reached" and "sold" standards to the cleaning worker and the union by recognizing the "personality" of these employees.

Now, the company's Milton M. Gingrich, Plant Services, is sufficiently satisfied with the program to install sanitation standards in other company plants.

A CLOSE LOOK AT JANITORS' DUTIES PAYS DUAL DIVIDENDS

"We have recorded a 31% labor saving as a result of our Janitorial Service Program," states Henry J. Steen, chief industrial engineer, Bell & Howell Company, Chicago. This program, along with incentives, was installed in 1954. The industrial engineering department maintains the program. Bi-annually, a complete survey of janitorial work is made, including daily base work loads, incentives, and additional work loads. Also, the janitor turnover rate has dropped about 30% owing to increased earnings and balanced work loads.

THE ATTACK ON

EMPLOYEE SERVICES

Streamlining Fringe Benefits

Your plant is probably paying 18 to 25% of gross labor costs in fringe benefits. And the figure is still rising. This checklist can help keep costs in line without sacrificing necessary employee services.

GENERAL

How long has it been since you reviewed the objectives of your benefit and service program? Have you permitted it to become a giveaway program rather than one that has the goal of improved employee morale and, consequently, increased productivity?

What effort do you make to assess results of your program? Do you measure its relation to reduced absenteeism, turnover, accidents, and grievances, and to improved quality and output?

Have you set specific objectives for your employee publication? Is it reaching these goals? Is it larger or fancier than you really need? Are you using the most economical printing methods, paper, etc. Are there other, cheaper communications techniques that could be substituted?

Has your attitude toward employee benefits encouraged an excess of free "government" work in your plant?

Is your purchasing agent offering too much free-buying service for employees?

When improvements are recommended in working conditions—such as lighting, rest rooms, eating facilities, air-conditioning—do you try to set a measure of their effectiveness on productivity?

When negotiating with your union, do you make sure employees have a choice between new benefits and their cents-per-hour cost in wages?

Can you consider restricting any additional employee benefits to those paid for by profit-sharing money, such as was done in the union contract recently signed by American Motors Corporation?

INSURANCE

Do your employees understand all the benefits to which your insurance entitles them? Are they encouraged to take full legal advantage of these benefits? Have you publicized the cents-per-hour value of the company's share of insurance premiums?

When did you last compare your present premium costs with the costs of insurance from other sources?

Can your insurance company aid you in reducing administrative costs?

Do you try to maintain the principle of employee-contributed (as opposed to fully company-paid) programs?

HOLIDAYS, TIME OFF, OVERTIME

Do you protect your holiday privileges with an attendance requirement both before and after the holiday?

Do you plan to limit additional holidays to area and/or industrial patterns?

Have you investigated the possibility of moving midweek holidays forward to Monday or back to Friday in order to have an uninterrupted work week?

Are you carefully policing wash-up time and rest periods to be certain that all other time is productive?

Are you watching work schedules for boiler operators, guards, and other 24-hour-day, 7-day-week operations in order to minimize overtime?

Are you careful to restrict the number of people on leave at one time so that your total employment obligation is minimized?

PLANT FEEDING FACILITIES

Have you considered using vending equipment to replace or reduce the number of cafeteria employees?

What are the possibilities for operating your cafeteria for a single shift only and relying upon vending machines or prepackaged sandwiches for the second- and third-shift operations?

Have you checked the cost of subcontracting your cafeteria operation in order to save administrative costs?

Are there possibilities of having cafeteria help work part-time on custodial or other jobs?

Can staggered lunch periods relieve the capacity strain on your feeding facilities?

Would it be feasible to limit the menu in order to reduce feeding costs?

Have you considered gradual withdrawal of subsidies to your in-plant feeding operation?

Are you utilizing cafeteria space for company meetings or discussions?

RECREATION FACILITIES

Are your expenses in this area commensurate with the number of employees who benefit from your program?

Have you audited your program recently to weed out those phases that draw least participation?

Do employees contribute their share of money to recreational facilities?

Have you considered delegating operational responsibility to your employee association and carefully restricting your plant's financial contribution?

Could an employee's garden club take over partial care of plant grounds? Would a camera club be useful in taking pictures pertinent to plant safety?

Are you spending too much money on team uniforms that benefit only a few employees? Are you underwriting expensive team trips?

Are you utilizing vending machine proceeds to help pay for your program?

TRANSPORTATION AND PARKING

Do you know the trend in your cost of maintaining access roads and parking lots?

If you use parking attendants, can they be replaced by automatic parking gates?

Will your local bus company erect and/or maintain the bus stops at your plant?

If you provide inter-plant transportation, can this be replaced by available public transportation? If you use company transportation to meet trains or to haul visitors, would taxis be cheaper?

How efficient and necessary are your intra-company vehicles? Can they be re-scheduled? Can part-time drivers be assigned to other productive work?

PAID VACATIONS

Which is more economical for your plant—a vacation shutdown or spaced vacations that require extra employees for vacation fill-ins?

Can vacations be spaced throughout the 12 months to minimize the number of employee fill-ins?

Do you insist that unneeded salary employees take their vacations during plant shutdowns?

What can your sales and purchasing departments do to curtail orders, shipments, and receipts during vacation shutdown periods?

RETIREMENT

Is an arbitrary retirement age of 65 actually costing your plant money?

What sort of effort do you make to assure that older or disabled workers are fully productive? Would early retirement of non-productive, disabled employees reduce the number of make-work jobs?

Will your union accept seniority concessions in assigning work for older or disabled employees?

MEDICAL AND HEALTH

Can you share medical facilities and staff with neighboring plants?

If you have a full-time doctor now, can he be replaced with a part-time doctor or one who serves on a fee-per-case basis only?

Can your plant nurse be replaced by a trained first-aid man who works full-time on some other assignment?

Do you rigidly distinguish between job- and non-job-connected health problems and avoid treating the latter?

Are you indiscriminantly offering unnecessary medical services—flu shots, sun lamp treatments, etc?

If you have an annual or regular physical examination program, is it worth what it is costing you?

Get the most out of your benefit dollar

Fringe-benefit costs are soaring. General Motors paid some 18¢ an hour per worker for fringes in 1947. Last year the figure was 72¢. You can hold the line on these costs, but the key lies in proper administration of your program—rather than slashing benefits haphazardly.

"Communicate! Familiarize your employees with details of your program. A sophisticated plan is worthless if workers are in the dark."—Kenneth MacHarg, Assistant to Director of Industrial Relations, Sperry Gyroscope Company, Great Neck, L.I.

"Custom-make your program to fit your company needs. Beware of package plans. What suits another company may prove wasteful for you."—G. A. McLellan, Manager of Industrial Relations, Olin Mathieson Chemical Corporation, New York.

"Shy away from special benefits —such as coffee breaks—for one department. They only arouse hard feelings in other groups, who will then make similar demands."—Dewey Hoye, Superintendent of Industrial Relations, Union Carbide Metals Company, Marietta, Ohio.

A PROGRAM TO FIT YOUR NEEDS

Consider what you can afford to spend and what your goals are before setting up or revamping your employee benefit program. Too many plant officials are all too eager to buy a package program from an insurance company simply because it works for another plant.

But even if that other plant employs the same number of workers and makes the same product, there are other facts to consider. How old is your working force? What's your profit margin? In what section of the country are you located? Are you in a rural or urban area? These factors can make the difference between waste and efficiency in any benefit program.

Above all, don't set up extravagant fringe benefits just to buy employee good will. Unions stress fringe benefits, but the individual hourly worker prefers cash every time.

Aim to balance your employee benefit package. Some plants go overboard on one type of fringe—say a liberal retirement plan—and find themselves vulnerable elsewhere. They're asking for union trouble.

COMMUNICATIONS

If you want credit for your employee services program, let your workers know what they're entitled to. Encourage them to exercise their benefits. This can be done by stories in your house organs, posters, special publications, letters to workers' homes as well as by word of mouth through your chain of command.

Some companies find a little imagination helpful. Hallmark Cards, Inc., Kansas City, Mo., has a do-it-yourself quiz game called "Benefit Bafflers," which it distributes to employees. M & R Dietetic Laboratories, Inc., Columbus, gives all its workers a facsimile checkbook—each check showing the amount the company spends on a particular fringe. U. S. Rubber Company, New York, passes out a form itemizing the value of benefits. The blue-collar worker thus knows his insurance package, for example, costs $227.72.

INSURANCE

Have the insurance company or your own accounting department break down the cost of your insurance package periodically. You may find certain coverage costing much more than is economically feasible, thereby alerting you to desirable revisions.

Check to see if some of your benefits—such as on-the-job disability pay—can be put on a direct payment rather than an insured basis at a savings to you.

Use deductable insurance wherever feasible. It can put an end to marginal claims which play havoc with your insurance rates. Also, beware of open-end policies, especially in the medical field. This will mean that every time there's an increase in hospital rates your cost will go up in like manner. Put a dollar-and-cents limit on benefits.

Don't go overboard on insurance that pays benefits only upon death. Generally, your employee will greatly appreciate benefits that protect him during his working life or during retirement.

SPECIAL TIME OFF

In granting bereavement leaves, specify the maximum time off and list what the worker's relation to the deceased must be to qualify. Thus, you avoid headaches when an employee wants off for his fourth cousin's funeral. Also, reserve the right to demand proof of death despite the fact that you'll probably never use it.

Coffee breaks can be a real headache if not regulated. Vending machines can alleviate the long hike to the cafeteria during the break with resulting waste of production time. If coffee is sold at the cafeteria, let a few workers in each department get it for the whole group. Consider installing supplemental serving lines in production areas. Make sure milk for the coffee is placed in dispensers rather than in containers, if you are supplying the coffee. Otherwise, you may be saddled with a good-size milk bill by milk drinkers.

RETIREMENT POLICIES

Keep the retirement age flexible so skilled craftsmen such as tool and die makers can be kept on the job for the convenience of the company. And so deadheads on the payroll can be eased out at the earliest possible age. Make sure you have minimum age and time-on-the-job requirements tied into your pension plan. Younger men usually don't think of pensions as an important job benefit factor anyhow and they're liable to change jobs several times before settling down.

Choose carefully between contributory or non-contributory pension plans. There are two sides of a coin for this decision. Workers usually think more of a plan they contribute to. And they can at least collect the money they put in, plus interest, when they leave the company. A non-contributory plan usually won't pay off for the worker until he retires. Thus, there is an added incentive to stay on the job.

HOLIDAYS

Make sure you don't pay for holidays that occur when an employee would not otherwise be working. These include: leaves of absences, illnesses, and layoffs.

Consider adopting a system of holidays in which time off is granted with an eye to minimum inconvenience to the operation of the plant. It's usually not too hard to sell workers on this as it gives them longer holiday periods. For example, the Friday after Thanksgiving can be substituted for Washington's birthday. This reduces the number of expensive plant shutdowns and startups.

Require each employee to work his last shift both before and after the holiday to be eligible for pay. This cuts the absentee rate.

EATING FACILITIES

Consider using vending machines rather than subsidized cafeterias. Latest models serve hot meals at reasonable prices, and at a profit to you. If a concessionaire runs the cafeteria, keep an eye out for quality and price. If the soup tastes like dishwater, your employees won't blame the concessionaire. You'll take the rap.

Check your cafeteria location to make sure it's convenient for most employees. You may save valuable production minutes with a change.

VACATIONS

Spread your vacation period over the widest possible span of time or shut the plant down for two weeks. This will cut the expense of vacation replacements. And with the shutdown method there will be no argument as to who gets the choice vacation dates.

Also make sure you have reasonable requirements as to hours worked before a production employee is entitled to a vacation. You might try providing standard vacation time off but make the vacation pay depend on the number of hours worked in the previous year. This provides the double benefit of covering part-time employees and acting as a positive incentive for employees to avoid absenteeism.

HEALTH AND MEDICAL PROGRAM

Make sure the stress is on preventive medicine and first aid rather than on complete hospital service. The only exception to this rule should be if your plant is located in a desolate area with inadequate hospitals or if you're in a hazardous industry.

Make sure you get expert advice on the optimum number of nurses and doctors for your size plant and industry. Substitute trained first-aid people who perform production tasks for nurses.

Many plants today are incorporating annual complete physical examinations for their workers. If you have such an examination, it's advisable to limit it to your key personnel.

If you need specialists on your medical staff, consider the possibility of hiring them on a part-time or consulting basis only.

MISCELLANEOUS

Keep your severance pay policy flexible to a worker's needs until he finds another job. But do not allow your supervisors to use the policy as a conscience salve when they discharge incompetent employees. You can't buy good will with severance pay, no matter how generous your contribution.

Employee stock option plans are an excellent means of getting your workers to take a personal interest in the company. But watch out if your stock value goes down. There's nothing worse from a morale standpoint for a worker to have money deducted from his paycheck for depressed stock.

Encouraging savings by means of payroll savings bond plans, credit union publicity, and savings bank deductions can pay off in employee peace of mind.

Beware of local merchants offering discounts to your employees. If you give them publicity, your employees will hold the company responsible for poor service and quality.

EMPLOYEE SERVICES

A benefit dollar holds 100 cents for these plants

Streamlining, not slashing, employee benefits keeps morale up and costs down

SAVE-NOW, GO-LATER VACATION CLUB

Payroll deductions for savings are nothing new in an industrial plant, but a variation of this system is paying high dividends in morale at Friden, Inc., San Leandro, Calif.

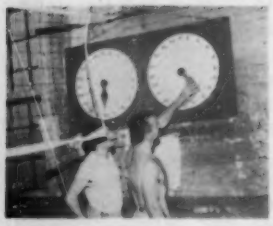
All too often financial worries have put a damper on blue-collar vacation plans. Thus, a primary company employee benefit goes down the drain as the worker sits around the house instead of enjoying a healthy recreational change from the everyday grind.

This can't happen to workers who sign up for the vacation club instituted by Friden in conjunction with a local bank. Employees are encouraged to authorize a payroll deduction that will mean money on hand for the next year's vacation.

After the first deduction is made, the bank forwards a passbook to the worker. Periodic visits by the worker to the bank keep the passbook up to date. This also encourages the savings habit.

Friden's vacation club differs from the traditional Christmas club in that workers can withdraw their money at any time, whether for emergency or other personal reasons.

The end result of the club is to allow the worker to get full benefit from his allotted vacation without having to go into debt.



WORKERS RUN THEIR OWN BENEFIT PROGRAM

All the benefits pictured at left are provided by the employees themselves at Winchester Western's New Haven, Conn., plant. Heart of the program is the Winchester Employees Club, which is almost self-sustaining. The company subsidizes the club only by giving it the space for its clubhouse, and by turning over the profits from vending machines.

The club gets the major share of its money from the Winchester fund—money voluntarily deducted from the employee's salary—which goes to charity as well as to the club.

A modern cafeteria, bowling alley, steam room, gymnasium, and even a masseur, are sponsored by the club, within the limits of its funds. This, of course, takes the burden of employee feeding off the company. Supervised recreation is conducted by a physical training instructor employed by the club. There are organized calisthenics (for both men and women workers), as well as volley ball and a number of other team sports. Exercise facilities, such as rowing machines, stationary "bicycles," and punching bags, help round out the gymnastic complex. Other club personnel employees supervise the cafeteria.

The club itself is run by a board of directors representing workers of various departments who are chosen by elections. The company has a liaison man to work with the club, but the responsibility of administration lies with the workers.

There has been no dispute with the unions over the jurisdiction of the club. On the contrary, both company and unions have cooperated so as not to make a bargaining-table "football" out of it.

HOT MEALS BY PUSHBUTTON

The image of a vending machine as simply a coffee or candy dispenser is as outmoded as the Brooklyn Dodgers. At E. H. Sargent & Company, Chicago, vending units dole out balanced hot meals at lunchtime. There are several meat and vegetable choices.

The meals are dispensed in three-compartment or non-divided aluminum containers (Kaiser Aluminum & Chemical Corporation, Oakland, Calif.). The vending machine (manufactured by Wittenberg, Inc., New York) automatically heats the entrees to 150 F. and maintains them at that temperature until sold. Both sides of the machine can be used for hot vending, one can be hot and the other cold, or both sides can be cold.

Vending machines can end the red ink of a subsidized cafeteria, while providing a variety of foods to employees at a relatively inexpensive price. There may even be a small margin of profit.

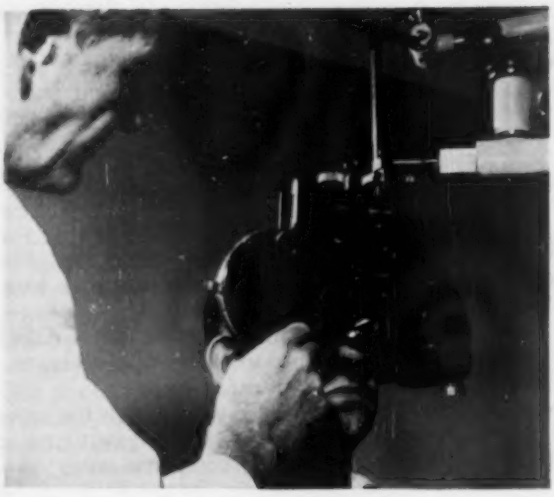
PSYCHOLOGY IN THE PLANT

Production employees at Worcester Valve Company, Worcester, Mass., are helped to adjust to increased responsibilities, overcome frictions with other workers, and solve problems that may arise outside the plant in the family or household.

Dr. Daniel G. Lear (right of photo) is a consulting psychologist of Nardle, Wilson Associates (also of Worcester). Here he explains to a new employee how he fared on his pre-hiring tests, what his strong points are, and what weaknesses are likely to need watching.

Dr. Lear is retained on a continuous basis by Worcester Valve and his work includes bi-weekly discussion sessions with groups of foremen and supervisors, department heads, and top company executives. In one typical case he convinced a highly productive but emotionally disturbed machinist that he was not really hated by fellow workers, as he believed.

MEDICAL DEPARTMENT STRESSES SAFETY



The emphasis is on preventive medicine and safety at Sperry Gyroscope Company, Great Neck, New York. Safety is the direct responsibility of the medical director. Thus, there's no problem of coordination between the safety director and the medical department. And this arrangement is paying off.

Getting workers to wear safety glasses at all times is a sticky problem in any plant. To encourage them, Sperry conducts free eye examinations (right) for all workers with jobs where vision is critical. If the worker needs corrective glasses, the company will furnish prescription safety glasses free of charge.

The company also conducts complete annual physicals for key personnel, but it has eliminated costly hospital facilities since local hospitals can treat any emergency within minutes. The medical department also retains a psychiatrist on a consulting basis.

THE ATTACK ON MAINTENANCE

The pickings for dollar savings in plant maintenance and engineering are like walking into a ripe berry patch. You can turn in any direction and find a rich harvest.

The questionnaire that follows is only a cross-section of hundreds of successful principles and practices that influence the maintenance cost picture today. Although not a complete audit, we believe you will find it penetrating.

ORGANIZATION

• Has the maintenance staff been increased lately to keep pace with technical and administrative advances? Can a lower-paid technician relieve a graduate engineer of time-consuming duties?

• Will an area-type set-up mean faster service to any production departments? Are area crews unbalanced so that some craftsmen don't have enough to do? Will an added foreman improve supervision and work output?

• Must you adhere to inefficient mechanic-helper concept? Have you pressed union for use of multi-craft worker in a higher classification?

ENGINEERING

• Does maintenance manager check all new building, facility, and machine specs and layouts for obstacles to low-cost maintenance? Are production people also consulted in design stage, to avoid later modifications? Are you using consultants advantageously?

• Are your engineers using simplified drawing practices, overlay assists, reproduction prints, and photographs to cut drafting time? Can you buy standard equipment rather than design special items? Have you developed standard practices to minimize design effort and simplify installation of standard facilities?

MAINTENANCE POLICIES AND PRACTICES

• Are you spending too much money, say over 15% book value annually, repairing or overhauling equipment that can be more cheaply replaced? Do old buildings require excessive maintenance? Are you checking repair costs on all machines over five years old?

• Is your level of maintenance set too high for aging equipment? Do you check actual level against goal at least annually by a plant-wide "conditions status" survey? Have you checked your costs against FACTORY's industry figures to discover and justify your own cost position? Can production workers do easy routine jobs, such as lubrication and simple PM procedures?

PREVENTIVE MAINTENANCE

• Are emergency jobs upsetting production schedules? If so, will more PM help? Have you checked true costs of PM versus breakdowns caused by poor maintenance to see whether you are over or under-maintaining?

• Has your inspection PM schedule been unrefined in the last year? Are you making needless shutdown inspections when a running inspection will do? Will modern inspection and diagnostic tools improve reliability and speed of inspections, such as vibration analyzers, optical alignment devices, ultrasonic gauges, portable X-ray equipment, dye penetrants?

CORRECTIVE MAINTENANCE

• Are you using a "cause code" to pinpoint reasons for out-of-line or repetitive repairs? Do you stagger-check "cause-code" records, say, monthly, to cover all equipment within one year? Do you regularly review a daily breakdown report, with time out in 1-min. increments?

SUPERVISION

• Are your foremen out on the floor at shift start to see that crews get started? Or are they tied to their desks by paperwork that a staff man can do better? Will personal mobile carriers or scooters improve their field supervision? Are they kept cost-conscious by the cost estimate of each job, by checking final figures?

WORK AUTHORIZATION

• Have you a clearly established route for work authorization, to prevent work being done contrary to management's wishes? Are big jobs first "approved in principle" to minimize needless estimates? Do you recheck all unstarted work requests over 60 days old?

JOB COSTING

• Does plant cost-account set-up distinguish between true maintenance and service to operations? Does maintenance have to duplicate accounting routine? Do existing accounts give maintenance manager the breakdowns he needs for intelligent analysis and to spot critical cost items and big spenders? Are you posting details to equipment records that you are not using or are no longer useful? Can you adopt mechanized tabulating equipment or office rental services?

WORK PLANNING AND ESTIMATING

• Are you making the most of mechanics' time and skills by giving them pre-planned complete instructions on best way to do each job as to method, sequence, and tools? Are all major and repetitive jobs given an "industrial engineering" analysis for work simplification and methods study, to eliminate or minimize cost? Are standard procedures updated at least every two years? Are all big repairs and overhauls checked by staff planners for possible use of prefabs, 3-D models, outside contractors and service repair shops, rental of special tools, either to cut cost, improve workmanship, or minimize downtime? Do you hold prompt post mortems on big jobs for further cost-cutting ideas?

• Have you ever had an industrial engineer check foremen's labor estimates against scientific standard time data to see how loose they are? Do foremen's estimates habitually run in multiples or half or full days, indicating jobs are stretched out that way instead of being figured more closely in fractional hours?

JOB SCHEDULING

• Do mechanics know what job to do at every shift start? Are you scheduling more than a full day's work for every mechanic so he never runs short? Or are foremen assigning "Make work" to take up any slack? Are too many men on the job at one time, getting in each other's way? Is sloppy scheduling (or none at all) causing needless idleness, delays, downtime?

• Are you scheduling work during costly downtime that can be done as easily during operating hours? On the other hand, can you postpone some repairs requiring downtime until a known overhaul period? Have you a definite policy on priority control? Are plant production people educated on advantages in long-range anticipation of needs, so maintenance workload can be efficiently balanced day by day?

• Does a low work backlog mean you are overmanned? Does too high a backlog cause costly delays and work interruptions? Do you regularly check wage roll for erasable duties? Are skilled workers wasted on unskilled jobs? Or doing work that is not maintenance?

LABOR PRODUCTIVITY

• Do mechanics knock off early for coffee break, lunch, quit time? Do they quit for lunch if on a short emergency job? Or quit early because it's too late to start another job? Or because washroom facilities or cafeteria are inadequate? Do you spot-check quality of completed jobs to discourage sloppy work?

• How much of your mechanic's labor-hour is unproductive (walking to job, waiting for instructions or tools or materials)? Will a materials delivery system cut idle time? Better supervision?

• Do you make regular checks on efficiency of productive labor-hours by a reliable form of work measurement? Have you considered a possible 20-30% boost in productivity through incentives? Is your incentive program based on loose standards that regularly pay an inflated bonus to one or more crafts?

TRAINING

• Have you projected your workforce needs for 1962, 1965, 1970? Are older mechanics being updated on care of new equipment and techniques? Are they taught scientific trouble-shooting routines?

• Are you making full use of vendors to train and update mechanics? Have you considered animated mock-ups and teaching machines for developing pneumatic, hydraulic, and electronic skills? Are you needlessly training mechanics in skills they will never need?

SHOPS AND OFFICES

• Is shop located in an inconvenient corner of the plant? Or is it near the highest activity? Are lighting, layout, and climate conducive to efficient work flow and execution? Do foremen have a decent office with proper files for easy reference to records?

EQUIPMENT AND TOOLS

• When equipment and tools are purchased on basis of labor-saving, do you follow through with equivalent force reduction? Will mobile equipment such as welders, staging, and wheeled carts improve performance? How about portable powered tools, and magnetic-base machine tools for making shop repairs right on site?

• Would more personal tools cut trips to tool crib? Are mechanics holding out tools so others are denied usage? Are new tools not used enough because mechanics don't know of them, or how to use them?

MATERIALS CONTROL

• Is there a central record of spare parts to avoid duplication in cribs around the plant? Do mechanics usually wait longer than two minutes at stores counter?

• When did you last check maximum-minimum quantities and re-order points against usage? Or review inventory for items not moved within two years? Are you deferring purchase of spare parts where not needed soon, with a protective tickler system? Is every new item checked for necessity, interchangeability, standardization? Are job leftovers tagged for proper return and account credit, or for scrap disposal?

• Can you set up "giveaway" bins on low-cost items to relieve manning needs? Can you arrange for instalment deliveries on an annual quantity discount basis?

LUBRICATION

• Do you have an organized lube program with scheduled frequencies and route? Will centralized lube systems cut lube labor costs, insure greater machine life? Are idle machines tagged to suspend lube services? Is every bearing failure studied for cause and prevention?

10 ways to cut

It's easy to cut maintenance costs. Just clip the payroll. That's not the kind of cost-cutting we're talking about. The challenge is to cut costs without decreasing necessary maintenance services. In fact, some plants ought to increase their maintenance costs to cut excessive downtime and quality rejects. For them it would pay in a lower over-all product cost.

Prime rule, then, is: First check the effect of every maintenance cost-cutting move on the entire plant operating economy. Don't act in a vacuum. As Robert Wilson, maintenance consultant of Cresap, McCormick & Paget (New York) puts it: "Top management must encourage the global plant viewpoint. Production, engineering, and maintenance together, not separately, influence maintenance costs."

Once inside this framework we are on solid ground to look at ways to cut costs within the maintenance organization itself. Hundreds of ways are open—the preceding checklist on pages 104-105 pinpoints only a few. Now let's get a bird's-eye view of a program that will ferret out whatever of these hundreds of cost-cutting opportunities exist in your plant.

GET ALL THE COST FACTS

Many plants don't yet have them. Maintenance managers are whacking away in the dark without them. By facts we mean detailed, certified cost data that you can use to control all segments of your maintenance operations—not lump-sum figures. How detailed? In at least the degree of refinement you need for production operations, and for the same reason: intelligent control.
ACTION: Get maintenance manager and controller together to work out a suitable cost reporting program.

CHECK MAINTENANCE EFFICIENCY

Simply go down into the plant and ask the views of production heads. Then question maintenance people (if they'll tell you). A sure-fire way is to check maintenance worker activity by work sampling techniques. Don't be surprised at the score. Says E. G. Fremont, Sr., president of The Emerson Consultants, Inc. (New York): "In preliminary studies of many plants productive time averages under 50%, as low as 25%."
ACTION: Use a competent industrial engineer to check work pace of mechanics. If pace is OK, and productive utilization of total time is poor, you know the maintenance management "system" is at fault.

GIVE THE FUNCTION PROPER STATUS

Biggest two gripes (in a recent FACTORY survey) of the maintenance manager: lack of proper recognition by higher management and its poor understanding of maintenance problems. In short, in the eyes of his boss and confreres he's a nobody. Says C. E. Knight, manufacturing manager of Monsanto Plastics Division (Springfield, Mass.): "True cost reduction considers relationship of a project to manufacturing problems and needs—therefore a maintenance manager must be on the management team." Another sore point is the lack of adequate staff—administrative and technical. "Lack of a separate control group is biggest source of failure" cautions Jesse Jessen, a DuPont staff maintenance consultant.
ACTION: Give maintenance head a respectable office, plus help to uncover inefficiency and to control work.

PRACTICE COMPLETE MAINTENANCE ENGINEERING

It's as yet a little explored but rich field of endeavor. The concept is broad. You begin with a new attitude in basic design of buildings, facilities, and processes: Try to eliminate as much maintenance as possible. Then apply a preventive maintenance program to what's left, to minimize wear and tear. Maybe you can alter a process with recurring high maintenance costs, or substitute a less costly one. Keep alert for better or cheaper materials. In one case plastic-coated valves replaced stainless steel at one-fourth the price. In another case a titanium fan costing $17,000 paid for itself in 15 weeks in savings in repair costs, with further weekly savings of $1100 for months to come. Any good maintenance manager can give you a list of savings potentials from engineered maintenance as long as your arm. As the last step, analyze your equipment records for items showing repetitive repairs or high maintenance costs. They are sitting ducks for savings by a re-design of parts or changes in process. To sum up, apply MP, PM, and CM—maintenance prevention, preventive maintenance, corrective maintenance. Bonus: You'll rarely have a breakdown!
ACTION: Instruct your design and plant engineers to calculate maintenance requirements and dollar costs in every project. Have every project spec checked by maintenance manager.

APPLY MODERN CONTROL TECHNIQUES

Can you imagine efficient production without shop orders that are fully planned, estimated, and carefully scheduled? Yet maintenance is sluggish in adopting such techniques, isn't too convinced the savings far outweigh the administrative costs. Let's look at some success stories. In one multi-plant company staff planning boosted worker effectiveness level 70 to 100%. Ethyl Corporation (Baton Rouge) saved 10% in manpower by daily scheduling. Bell Helicopter Corporation (Fort Worth, Texas) cut its plant engineering and maintenance roster this past year from 190 to 167 largely by emphasis on better scheduling. A long-term program

of controls at Wyandotte Chemicals Corporation (Wyandotte, Mich.) has cut crew size 40% in 5 years.
ACTION: Check the percentage of planned and scheduled jobs to total. If below 75% or so, you may hit a goldmine of savings by more emphasis on these phases.

ADOPT INDUSTRIAL ENGINEERING APPROACH

Every job must be planned by someone. Staff planning has proved far superior to that done by a foreman or mechanic. A "line" man, thus relieved, can concentrate on use of supervisory and craft skills. A staff man can apply industrial engineering skills—methods study, work simplification, development of standard practices and repair procedures, study of new materials. At the Tapco plant of Thompson-Ramo-Wooldridge, Inc. (Cleveland), as part of an over-all cost reduction effort, every maintenance job is being analyzed by industrial engineering methods techniques. Standards are being set on each job. Result: 10 to 20% cost reduction at normal operating rates, better maintenance service, better trade coordination. Prestudied procedures for a big job, reports James Quinn, a DuPont maintenance staff consultant, cut repair downtime 70% over estimate.
ACTION: Set up a separate full-time staff, in addition to any existing staff, with sole duty to find ways and means to cut maintenance costs.

USE CAPABLE PEOPLE

It takes smart people to cut costs. Start with the maintenance chief. Is he as good a manager as an engineer? "Better management actually *forces* maintenance cost reductions," urges John W. Roberts, president, Albert Ramond & Associates (Chicago). Scan again the checklist to realize how far it goes beyond engineering problems. Now look at your foremen, each of whom controls upward from $\$\frac{1}{2}$-million per year in labor and material. Ever view it that way? Is he qualified? Next, the mechanic. You wouldn't put a plumber on a machinist's job. But industry often expects untrained men to do a good job. A study group recently reported to FACTORY: "Maintenance performance scores are affected in a large measure by level and amount of training." One example: Downtime cut 40% within one year, quality improved, cost of training repaid three times over at Raytheon's Industrial Components Division (Boston).
ACTION: Make sure you have a good maintenance manager—the other improvements will then follow.

PROVIDE SERVICEABLE STORES

If your maintenance storeroom is typical of many others, you've got a fortune needlessly tied up in inventory. Experts agree the annual carrying cost of inventory averages at least 20% of its value. One company recently found 50% of its inventory—totaling in the millions—was both in obsolete and over-stocked items. Another company found itself holding $200,000 worth of needless spare parts. Lack of prompt storeroom service is the other half of the dismal picture. This means idle worker time, prolonged repairs. The answer is scientific management of storeroom records and procedures.
ACTION: Make a work-sampling study of waiting time by mechanics for spare parts or supplies at storeroom —it will point to the next move.

BOOST LABOR PRODUCTIVITY

You can do it by installing a reliable WM (work-measurement) program. WM is the cost-reduction jackpot, according to every maintenance consultant you meet. "Productivity can be boosted 50 to 100%, maintenance costs cut 30 to 40%"—H. B. Maynard, president, Maynard Research Council (Pittsburgh). "A program of day-work measurement using simplified estimating data, with good supervision, will net 25-35% reduction"—James E. Duncan, president, The Work-Factor Company (Haddon Heights, N.J.) "You can expect net cost reductions around 25%"—Andrew Huber, A. T. Kearney & Company (Chicago). Replies from Ramond, Emerson, and others sing the same tune. All agree, too, that administration costs run 3 to 7% of maintenance payroll. What puzzles FACTORY is the coolness of industry toward adopting WM. True, most plants are not geared to do it themselves. But seemingly formidable installation costs by a consultant may be recovered several times over in getting the program into action that much faster. Also, the consultant keeps you out of trouble in the difficult installation stage.
ACTION: Look at your maintenance craft payroll, decide whether or not you want to slice off a net 10 to 50% within 12-18 months by WM. But first clean up organization, methods, storeroom, and other problems.

PROVIDE LATEST TOOLS AND EQUIPMENT

Industry is sold on mechanization for cutting production labor costs. Maintenance can profit likewise. Do your men have to use a hand tool where a portable power tool will do the job ten times faster? This mechanization idea applies right across the board—maintenance tools, inspection tools, material handling equipment. A Texas oil refinery saved $12,000 a year by use of a simple work-platform lift, cut the repair crew from 5 to 3 men. Cost of loading, moving, and laboriously unloading materials, discovered one of DuPont's larger plants, can run as high as 30¢ of the labor dollar. A saving of one man-week will justify a forklift truck, two weeks a yard crane.
ACTION: Set up an annual budget allowance for new maintenance tools and equipment, see that it's spent.

MAINTENANCE

4 plants cut maintenance costs...

...with Work Sampling

as at Quaker Oats Company, Oregon, Ill.

"If you need to get operating facts fast, inexpensively, and reasonably accurate, work sampling is the ideal technique to use. And it's particularly appropriate for cost-cutting in maintenance." So says Ken McBrady, supervising maintenance engineer of some 28 Quaker plants throughout the U.S.A., ranging in size from 3 to 130 maintenance workers. Work sampling is solving three problems for Quaker Oats:

1. Need for facts on how maintenance personnel spends its time. How much time in working, conversation, idleness, traveling, assisting, and clerical? Today each plant knows the percentages in each of these categories. And it is thereby learning how to obtain the highest utilization of trained and skilled personnel.

2. Need for direction of cost improvement efforts. In other words, which areas provide the greatest potential savings, or are in most need of management effort? The very first Quaker work sampling survey pointed out such areas. For example, at one plant travel totaled 40% of the department's time. At another, idleness came to 25%. At a third, conversation took 17%. Thus management knew where to concentrate.

3. Need of basis for evaluation of progress in improvement. Each plant has to know if and how effective its steps for improvement are. The first Quaker Oats survey has established a bench mark. Preliminary scores in a second survey now in progress show distinct improvement in all plants but one. Future surveys will keep management informed as to further progress.

...with Work Measurement

as at Michigan Carton Company, Battle Creek, Mich.

Maintenance labor costs cut 20% in nine months! This was the result of a program of better management controls, spearheaded by work measurement techniques.

"Heretofore we had been concentrating on direct labor controls to improve our profit status," says Lou Phillips, vice president of engineering. "Then we decided maintenance costs had not received attention in proportion to their impact on total costs." To this end MCC called in the consulting firm of A. T. Kearney & Company of Chicago, which was experienced in maintenance measurement and control and equipped with a catalog of maintenance standard data. Such data were essential as a yardstick for measurement of labor effectiveness, thereby defining areas for improvement.

The first study was confined to a mill and carton plant, involving 35 maintenance people. Application of predetermined standard times to various maintenance jobs on a random sampling basis revealed an unusually high performance level of 62%. This was due to good supervisory and budgetary controls. But because it still indicated a potential cost reduction of up to 25%, MCC approved the cost of an improvement program.

Meetings were held with all supervisory, staff, and maintenance personnel to outline program objectives. Crafts included millwrights, pipefitters, welders, electricians, construction men. A maintenance planner was added to the staff, and was trained by the consultants in the application of predetermined time values. Thus he was able to provide consistent and valid estimates to be used in planning and scheduling jobs. The "catalog" standards were modified to reflect physical facilities and conditions at MCC, to insure accurate measurement of true craft performance. In addition, control reports were developed to identify backlog, craft performance, and progress on cost reduction.

Based on reliable performance evaluation, Lou Phillips and his supervisors determined the weak and costly areas and set up specific remedies. They were aimed to strengthen preventive maintenance procedures, improve work methods, and increase utilization and effectiveness of individual craftsmen. In nine months standards coverage was over 70%, and effectiveness reached the 80-85% range. Actual profit improvement, obtained by reductions in personnel, improved efficiency, and assumption of a bigger workload, was 20% of maintenance labor costs. This includes added cost of the planner. The one-time consultant cost for installation of the program ran about $10,000.

...with Work-Order Control

as at Draper Corporation, Hopedale, Mass.

No craftsmen work without a written work order at Draper. Yet complete work orders are issued to men moments after requests are made. An electric dispatching system sees to that. This airtight control is the bedrock supporting maintenance work assignment (including application of time standards and incentives), job costing, and performance evaluation.

The Draper plant has 40 acres of floor space distributed throughout four-story buildings. A master mechanic supervises eight widely separated service departments with over 200 workers, in such diversified activities as machine repair, electricians, plumbers, millwrights, carpenters, masons, cleaners, painters, and transportation and yard crew. All requests for maintenance work must be telephoned to a control center in the master mechanic's office. Here a dispatcher writes out a complete work order. It shows job description, location, charges, time standards, name of requestor.

Until recently the order was written on a duplicating register producing four copies. Service departments had to pick up orders hourly by messenger. This service was too slow. Many orders, such as emergency repairs, had to be phoned to the department. Thus craftsmen often started a job without a written order. This set-up required seven people in the control center.

The new Comptometer Electrowriter system (on a rental basis) has solved the problem. It provides two sending machines in the control center (see photo of one desk, at right, above), with pushbutton selection to a receiver in each service department. The dispatcher writes instructions as before, but they are instantaneously transmitted to a preselected receiver. This improved set-up requires only three people plus a part-time supervisor. The second man acts as assistant

dispatcher, processes completed orders, and compiles management reports. The third man sets new standards, updates others, estimates proposed jobs, and compiles special reports. Other benefits:

1. Elimination of messenger service (8½ man-hours per day). Annual net savings from this run over $2000.
2. Servicemen can often get to job sites in less than a minute after original request.
3. Reduction of about 100 phone calls per day from control center, which used to tie up two people.
4. Better job scheduling because foremen have up-to-the-minute backlog.
5. No accounting errors from missing charge numbers.
6. Improved worker motivation because every order shows time standard.

. . . with Work Materials Control

as at Hughes Aircraft Company, Culver City, Calif.

Stores inventory of 12,000 different items sliced 30%. Inventory valuation cut by $25,000 through elimination of obsolete, duplicate, non-moving, or immediately purchasable items. Waiting time for 75 craftsmen each day reduced an average of 5 minutes each.

These are the impressive benefits flowing from the centralization of various maintenance storerooms (mechanical, electrical, plumbing, garage, and so on) at a single, newly established maintenance operations center. The central storeroom was part of a major move toward consolidation with other maintenance support functions, such as radio dispatch of maintenance trucks, material follow-up office, trouble-call desk, and equipment record files. By eliminating overlapping duties, manpower needs dropped from 15 to 10 people. Over-all annual dollar savings total $48,000, much of which can be credited to the new storeroom set-up.

Key to efficiency of the storeroom operation is the parts identification system. Heretofore there had been no unified system that gave complete data on each stores item—location, usage, availability, optimum stocks, prices, sources of supply, and immediate visibility of what was on order. Adequate review and control of stores material expenditures were impossible. Material was hard to find, craft waiting time was excessive, inventories were poorly constructed, equipment repairs were often delayed for lack of repair parts.

The standard material identification system adopted by Hughes solved these problems in one easy stroke. Materials are issued by stock number for machine parts or by standard nomenclature for general-use items.

Application of this stock number is simple. What's more, it was easily adapted to the existing stock numbering system. Contrary to accepted practice, Hughes does not develop and apply its own parts code numbers, but retains manufacturers' catalog identifications. It has set up a modified Visi-Record file (photo) which records the parts of each manufacturer it stocks in separate easy-to-find filing sections. Each part is listed on the card numerically by part number, and is assigned a bin or drawer location number. This bypasses all coding complications. Craftsmen ask for parts by manufacturers' numbers obtained from a complete catalog file at the storeroom counter. Extra catalogs are provided at outlying buildings for phone delivery requests. Yet no items are duplicated—similar parts are assigned the same location number. Otherwise, the record system provides the usual inventory control features—stock on hand, usage, re-order point, etc. A traveling purchase requisition minimizes paperwork.

THE ATTACK ON MATERIAL HANDLING

Are you increasing your material

	Yes	No
1. Do you avoid receiving prepalletized raw materials?	☐	☐
2. Do you still receive raw materials in 50- to 100-lb. bags when usage is 1,000,000 pounds or more?	☐	☐
3. Are you warehousing materials that can be delivered in one hour?	☐	☐
4. Are you storing only 12 feet high?	☐	☐
5. Are you manually handling objects weighing over 50 pounds?	☐	☐
6. Do many of your handling jobs require two or more workers?	☐	☐
7. Do you use power equipment on jobs that could be handled by some gravity means?	☐	☐
8. Have you overlooked designing your conveyors to do secondary operations, e.g., count and weigh units, slit open bags, segregate stock automatically, etc.?	☐	☐
9. Do you mechanically handle materials to point of use and then hand feed?	☐	☐
10. Is production work held up because of poorly scheduled delivery and removal of materials?	☐	☐
11. Is your motive handling equipment busy only 50% of the shift?	☐	☐
12. Do your lift trucks travel empty more than 20%?	☐	☐
13. Are your handlers loading carriers' trucks?	☐	☐
14. Are your lift trucks over 10 years old?	☐	☐
15. Do you fail to keep accurate handling equipment maintenance records?	☐	☐
16. Do you service equipment only after it breaks down?	☐	☐
17. Do you assign crew sizes by custom rather than by work measurement standards?	☐	☐
18. Is your communication system to handlers limited to personal contact rather than instantaneous response with two-way radio, etc.?	☐	☐
19. Are your floor load ratings under 175 pounds per square foot?	☐	☐
20. Do you omit the use of material handling engineers in assisting in the design of new plant layouts and new equipment?	☐	☐

Score 3 points for each answer ( ) ( )

	Yes	No
1. Do you not let vendors carry your inventory?	☐	☐
2. Do you still plant-weigh individual delivered pieces instead of getting certified truckload weights?	☐	☐
3. Do you fail to receive materials at their point of use?	☐	☐
4. Are your storage aisles more than 8 feet wide?	☐	☐
5. Do you temporarily store in aisles for convenience?	☐	☐
6. Are you overlooking storage out-of-doors in rubber or aluminum bulk bins?	☐	☐
7. Are you keeping large reserve stocks on hand to play it safe?	☐	☐
8. Are inadequate storage facilities hampering efficient scheduling of movement?	☐	☐
9. Are you using too many pieces of equipment because their scope of activity is confined?	☐	☐
10. Must you restrict lift-truck travel because of low passageway clearance and/or lack of hi-low masts?	☐	☐
11. Do you allow transport of materials without requisitions?	☐	☐
12. Do you handle drums instead of pumping from tankage?	☐	☐
13. Are you handling single pieces when unit loads could be handled?	☐	☐
14. Do you avoid using tractor-trains when hauls are over 150 feet?	☐	☐
15. Are you rehandling materials frequently?	☐	☐
16. Do you neglect to keep records on material handling breakage?	☐	☐
17. Have you incorporated insufficient vibrators in your bulk handling systems?	☐	☐

handling costs by making these mistakes?

	Yes	No
18. Are you using ground loading of trucks or cars because of the lack of docks?	☐	☐
19. Do you fail to ship in bulk containers between plants?	☐	☐
20. Are you assigning handlers only one job at a time?	☐	☐
21. Are you letting paperwork tie your supervisors to their desks?	☐	☐
22. Do department heads regularly fail to give advance notice of request for service?	☐	☐
23. Do you honor requests for over 5% unscheduled material movements?	☐	☐
24. Are you using a variety of models and makes, which require a high spare parts inventory?	☐	☐
25. Are you keeping extra equipment around for peak seasons rather than using short-term rental?	☐	☐
Score 2 points for each answer	( )	( )

	Yes	No
1. Do inadequate aisles trap stock behind long rows of materials?	☐	☐
2. Are you storing drummed liquids on their sides rather than upright on pallets?	☐	☐
3. Are you storing unstable palletized loads in the open rather than in racks?	☐	☐
4. Must you relocate all your stock to inventory?	☐	☐
5. Are you overlooking the elimination of aisles with overhead cranes?	☐	☐
6. Are you avoiding using vendors' cartons as work bins?	☐	☐
7. Are you manually weighing charges when continuous weighing devices can do this automatically?	☐	☐
8. Are you still using elevators rather than triple-stage masted lift trucks to supply second story operations?	☐	☐
9. Do you fail to use conveyor loops to supply operating supplies, jigs, or packaging materials from central storage?	☐	☐
10. Is your conveyor system inflexible or nonportable?	☐	☐
11. Are you manually handling in possible explosion areas rather than using the explosion-proof diesel or electric lift trucks?	☐	☐
12. Do you not use high-capacity equipment to minimize handling?	☐	☐
13. Are you still penalizing your warehousing and shipping operations by using 48-in.-wide instead of 40-in.-wide pallets?	☐	☐
14. Do you neglect to repair broken pallets immediately?	☐	☐
15. Do you fail to use air-freight to eliminate large inventories and regional warehouses?	☐	☐
16. Are you assigning handlers to areas rather than jobs?	☐	☐
17. Do you avoid using job rotation to minimize handling coverage problems due to illness or vacations?	☐	☐
18. Are you using make-shift equipment in place of proven designs?	☐	☐
19. Are night personnel regularly borrowing handling equipment?	☐	☐
20. Does company practice prevent you from renting new equipment for trial purposes before purchasing?	☐	☐
Score 1 point for each answer	( )	( )
Total points scored	( )	( )

Conclusions: If you score 117-130 points in the "no" column, you have a good operation. If you score less than 90 points, you are in serious trouble. 104-116 points is fair; 91-103 points is poor. For those less than perfect, reading the following two pages (written by a noted material handling consultant) will help.

Purge material handling cost

The following techniques don't require experts. They can be used right now by your present staff to slash material handling costs as much as 25%.

By **RICHARD J. SWEENEY**, Partner, Drake, Startzman, Sheahan and Barclay
Distribution and Materials Handling Consultants, New York City

1. Purchase and handle material in unit loads

Receiving and inventory control will be simplified by procuring in palletized unit loads. However, do not overlook other types. Bulk containers, designed for mechanized handling, offer economies over receiving smaller lots of powdered materials in sacks. Palletless unit loads, such as glued loads and large cartons designed for handling by special lift-truck attachments, present another opportunity.

2. Receive materials at the point of use

Many large items of raw and in-process materials can be received near where they are used. Here, certified inspection reports can be used to satisfy accounting and inventory requirements instead of assigning a receiving clerk. This reduces congestion on the receiving dock, minimizes warehouse space needs, and eliminates one or more handlings of large tonnage items.

3. Tighten inventory and production controls

Excessive inventories increase space, handling, and financial costs. Take advantage of vendors' warehouses. Calculate economic lot sizes and reduce the number of lots in production. Develop standard times for each lot to move through the shop. Use sales forecasts and sales history to balance the number of lots of each item when manufacturing for inventory. Provide definite in-process storage areas. Reduce packaging supplies.

4. Store tools and supplies at point of use

Central tool and supply cribs often increase costs. Investigate the advantages of providing small open cribs near the production equipment, with periodic replenishment from a central warehouse.

5. Rationalize production

Provide an orderly flow of materials through the shop. Cut cross and back hauls by relocating production equipment with the help of process flow sheets. In many cases, the only major relocations needed involve secondary operations, such as drill presses, buffers, small turning equipment, and the like. These can be moved with a minimum of effort and expense. Combine operations with automatic transfer of materials between them. Provide large enough hoppers to operate for substantial periods before handling service is needed. In this way, handlers can service greater areas.

6. Improve scrap handling

Provide self-dumping scrap bins, which are fed automatically by production equipment and removed by lift trucks. Use in-the-floor conveyors or air-blowing systems to move scrap long distances automatically. These should provide for scrap classification, thus increasing scrap resale price.

7. Combine packaging with last production step

This will accomplish three objectives—transfer products to the warehouse in larger quantities per move, improve protection during the move, combine packaging with individual piece handling at final production or inspection operations. It takes advantage of the normally faster pace of production workers. Vibratory or other automatic carton fillers, and weigh counting instead of hand counting, will further reduce cost.

8. Improve packaging

For easy palletization, package length should be 1.5 times the width, and height should be no greater than the width. Package larger quantities in each container. Reduce package weight by using corrugated over-packs and by eliminating separators and pads. Design the container to withstand high stacking and impact loads.

9. Mechanize long-distance transport

Restrict lift-truck transport to 150 feet one-way, and overhead cranes similarly. Use hand trucks only for short hauls where the demand is intermittent. Otherwise, use tractor-trains, powered conveyors, pneumatic conveyors, or pipe lines.

with down-to-earth approach

10. Arrange warehouse for maximum efficiency

Locate receiving docks adjacent to bulk reserve storage areas. Size the depth of storage in reserve stock areas to maintain turnover and yet minimize the need for aisles. Provide high stacking of merchandise by using pallets, racks, and bulk containers to utilize all available warehouse cube.

Separate stocking and picking aisles to minimize congestion. Keep picking heights to a maximum of 7 feet, when possible, to prevent delays caused by pickers having to climb stacks to reach items. Store heavy and popular items waist-high to reduce picking effort. Use gravity-feed racks to increase item exposure per foot of picker travel.

Consider popularity storage (placing popular items near aisles with other products stored in decreasing order of popularity) to reduce picker travel. Try dividing the warehouse into zones, with each picker responsible for picking only that part of each order calling for material in his zone. Remove picked orders mechanically in multi-story or spreadout operations.

11. Arrange orders in picking sequence

Picker productivity is reduced and errors increased by orders that force them to backtrack and hunt for items. The office should arrange to list items on orders in the sequence of picking. If customer orders have few items, the office should combine several of them into one picking order to reduce picker walking.

12. Combine picking, checking, and packing

Pick, check, and pack orders in one operation. Double checking is costly. If circumstances prevent adopting this completely, consider assigning picking, checking, and carton filling to the picker. Stuffing, sealing, and weighing can then be done on a central production line using special equipment.

13. Improve the shipping operation

Provide straight-through movement from warehousing through picking to shipping. Provide adequate shipping accumulation space to eliminate congestion on the dock. Accumulate picked orders by shipping line to reduce searching errors, and lost time. Complete the necessary paperwork before carriers arrive at the dock to eliminate waiting time. Use extendable conveyors to bring cases directly into trucks and cars. Require carrier drivers to load their own vehicles. Provide suitable dockboards to permit unit loads to be landed inside trucks and rail cars. Try making unit load shipments to other company locations to reduce handling in shipment and receipt. Stagger loading times to prevent congestion at the dock and to permit steady work for warehouse crews. Consider using drop trailers and shipper load and count when you have limited dock space.

14. Schedule material handlers

Stagger starting times according to the work load, rather than to historical shift practices. Handlers are service employees and they should be on tap when their services are needed. Picking-line replenishers can start ahead of pickers; loading of trucks can be done on the afternoon shift rather than the day shift. Provide regular backlogs of work to even out activity.

15. Establish performance standards

Develop handling standards with work sampling. Supervisors will then know what is expected of them and how their crews should be performing from hour to hour. Send status reports to management for analysis.

Transfer and balance handlers according to the work load and to changing priorities. To facilitate this, job descriptions should be broad and the number of handling job classifications kept to a minimum.

16. Minimize handling equipment needs

Handling equipment and personnel are usually spread out over wide areas in the plant. Adequate means of communciations are necessary to insure maximum equipment utilization. Investigate two-way radio dispatch and closed-circuit television. Avoid assigning equipment to specific departments. This sacrifices efficiency. Schedule jobs by areas to minimize travel time and to avoid empty trips. Consider having second-shift operation so as to use fewer pieces of equipment.

17. Do not wait for automation

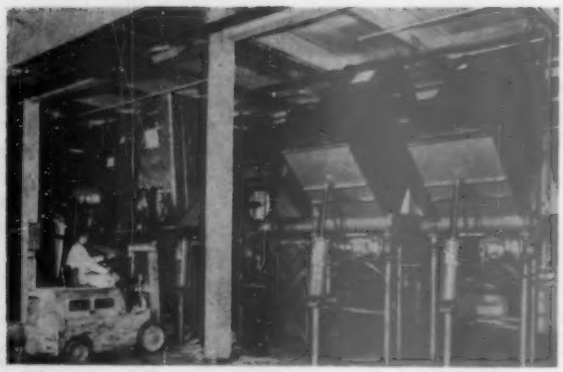
If one waits for the perfect solutions to handling problems, one will never solve them. The best method of attack is to exploit the techniques given here. Mechanize where feasible; extract all wasted labor; and then consider automation on its merits as compared with an efficient operation.

Advanced material handling systems

After years of education, everyone has streamlined material handling. But the leaders are now going all out for advanced systems, which make major break-throughs in operating costs and working capital.

The continuous flow principle eliminates all warehousing at Schenley Distillers Company, Louisville, Ky. This is made possible by timed delivery of glass.

Schenley informs suppliers how many trailer loads of cased empty glass will be required on a given day and the time of arrival for each load. On schedule the trucks roll up to the receiving dock and are connected to the supply conveyor by a length of portable conveyor (left). At the right moment an operator starts unloading the trailer. Just 13 minutes later the filled bottles in their original cases dicharge from 1200 feet of processing conveyor into waiting trailers and freight cars. This system proved so economical that it is now S.O.P. at all Schenley plants.



Streamlined handling and reduced inventory result from use of 2500-lb. aluminum tote bins at Springday Company's V-belt manufacturing plant (Springfield, Mo.). Bins act as returnable shipping containers, storage units, and discharge hoppers for powdered carbon black.

Groups of 14 full and empty 110-cu.-ft. bins shuttle between plant and supplier. Hardly off the trailer, selected bins are lift-trucked to a six-position, dust-tight discharge station (left). This meters out predetermined amounts of black from each bin and blends them on the way to the Bambury mixer. As there are different grades and proportions of blacks over a range of formulations, the bins can remain in place until empty or be removed when part full.

Dynamic raw material handling marks bottle manufacturing operations at the Tampa, Fla., plant of Thatcher Glass Manufacturing Company. In minutes, the glass furnace swallows 9-ton charges of carefully weighed and blended multiple components. The handling system has to provide continuous charging from a storage and batch-mixing house 100 feet away.

A motorized monorail system, composed of six trains with four batch cans each, gives high volume, automatic operation over a 200-ft. loop. Trains are sequentially filled, can by can, and advanced to the furnace area. The only manual activity required.is for the operator to press the acknowledge button to initiate the automatic furnace charging sequence (left).

help you crash through the cost barrier

Automatic scheduling and handling highlights Singer Sewing Machine Company's assembly conveyors at Elizabethport, N. J. There, several models of sewing machines in a variety of colors are produced simultaneously. Sequence of parts and models on eight interdependent conveyors is random, but a programed control console picks out desired units for selective processing (right).

Typical is the painting operation. The console determines which pieces are to be painted what colors and how frequently there will be a color changeover in the conveyorized paint booth. Transfer conveyors automatically pluck off selected pieces from moving storage conveyors and pass them through the electrostatic operation.

This well-engineered system provides minimum handling, high-speed order filling, and complete product protection. At the warehouse of Gageline Steel Corporation, Chicago, steel bars of four micro-inch finish cannot tolerate the slightest scratch.

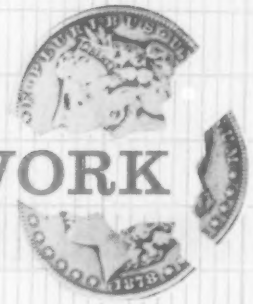
Nucleus of the system is a honeycomb storage rack composed of 1000 slide-out stock cradles. A lift truck with a special attachment pulls out the selected cradle (right) and transports all 3000 pounds to the weighing scale. Only then is the stock touched directly. Billable weight is determined by subtraction after the required number of bars is lifted off. The remainder is rewarehoused. Total cycle time, bin to trailer, for this one-man operation is 15 minutes.

Automatic movement easily expedites 150,000 tons per day in and out of this 287,000-sq.-ft. parts warehouse, Euclid Division of GMC, Hudson, Ohio. Backbone of the operation is Towveyor, an electronically directed dragline conveyor capable of pulling 165 4000-lb.-capacity floor trucks over a 1700-ft.-long path.

Turning two dials on each truck selects travel over one of five flow loops, and programs stoppage at the desired storage spurs (right). This sets up an electronic signal, which actuates the proper switches as the truck moves along the towline. At destination materials are stored manually or by lift truck.

Other operating advantages are low-cost order picking, broad flexibility, and easy expandability.

THE ATTACK ON PAPERWORK



Start by asking yourself these questions

CONTROLS

Is each piece of paperwork essential to performance of a major function?
Are reports essential to other operations, or do they merely give assurance that work has been performed?
Have conditions changed since each report concept was originated?
Could the information be obtained elsewhere?
Can frequency of issue be reduced?
Could a single file center for this report replace separate office files?
Are departments receiving reports in time to take action required?
Are retention times posted on all reports and correspondence?
Is the cost of producing each piece of paperwork justified by the result?
Do you limit data in written form to cases where:

- Detailed job instructions are required?
- Information received orally is hazy, likely to be misconstrued?
- Mental or visual controls result in wasted motion or erratic employee performance?
- There is reason to suspect dishonesty?
- Accuracy of information desired is so critical that memory should not be relied upon?
- Labor management negotiations are of consequence?
- Operations are suspected of having legal overtones?
- A manager would have to spend a great deal of time to search out information?
- Performance departs from the routine?

DESIGN AND PREPARATION

Is the title of each report descriptive and prominently placed?
Does the title clearly indicate the function intended for the form?
Have you left enough space for fill-in sections, signature, and comments?
Have you allowed for use of the form in office machines?
Do the reporting items appear in a standard sequence agreed upon for a family of reports?
Have you placed the most prominent data in the most prominent place?
Have you placed data needed in filing near the top and outer edges?
Does the form require instructions to complete properly?
If the form is to be mailed outside the plant, could you design it for use in a window envelope?
Have you standardized the size of all reports and forms?
Are typists busy all the time?
Can every piece be easily reproduced on existing equipment?
Could you set up a typing pool?

Are you reproducing forms by the correct process?
Have you used readable, attractive type faces?
Are you taking full advantage of snap-out forms?
Are weight, quality, and color right for the job intended?

DISTRIBUTION

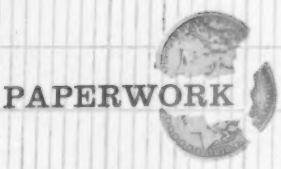
Can you reduce the amount of time a form is delayed before action is possible by those involved?
Have you considered batching to save time in movement between operations?
Is messenger service adequate?
Does all that paperwork really have to be forwarded?
Have you thought of using pneumatic tubes for report delivery?
Could you set up a "post-office" type of paperwork distribution schedule?
Are rush orders realistically marked?

EQUIPMENT

Does paperwork volume justify the use of automatic machines?
Are your machines properly installed, maintained, and operated?
Have you set up a regular equipment inspection schedule?
Do you need better control of reproduction equipment?
Are machines being used at maximum capacity?
Do you know where each reproduction device is located in your plant?
Are you sure each machine is being used to its full potential?
Can you use automatic gathering and sorting aids?
Do you need a specially designed table for equipment and reference?

AUTOMATIC DATA PROCESSING

Is present operation being carried out economically?
Would machine really be an improvement? Why? How?
Would additional data gathered with the new equipment make an important difference to your operations?
Will the machine fit into long-range plans?
When will the new machine become obsolete?
Do employees object to the present way of doing things?
What are costs now? Are they really too high, or are they in line with other plant costs?
How important is time in this operation?
How much supervision is needed in the present operation? With the new machine? Is it adequate? Too much?
Will the new equipment consume too much space?
Will the new machine make other forms and operations obsolete with its efficiency?
Will its superior qualities set off a chain reaction of buying?
Are trained operators already available in your plant?
Will extensive training be required?
Will salaries go up much as a result of the need for more skilled people?
How long will operations be down during changeover?
How long will training and break-in last?
Will a dual system be required during the changeover?
What will maintenance and supply costs be with the new system?
How well can emergencies be handled? Can breakdowns be handled quickly?
Will the machine operate efficiently at abnormal peak periods? Or just at peak periods?
What unusual situations are apt to occur with the new machine?



The paperwork monster is a plant-wide problem; treat it like one

Brush it off as a "clerical worry" and paperwork will assault your profits. Spotlight it. Make it toe the mark with other departments.

MAKE SOMEBODY RESPONSIBLE, GIVE HIM A BUDGET, AND TURN HIM LOOSE ON THE PILE

Of all your plant's indirect costs, paperwork is the only one with roots in every area of plant operations. Treat it should assign one man to the over-all job of putting writing its decision to attack these costs. Simultaneously, it should assign one man to the over-all job of putting the paperwork house in order.

In a small plant—say up to 500 employees—the man in charge need not be a full-timer. He might be a personnel assistant or assistant to the plant manager. A larger plant should have a full-time man.

Whichever the case, the paperwork job should be given solid status. It should have a budget and management responsibility. Then a permanent committee should be appointed, with one man from each plant department. These committeemen should act merely as coordinators of action and reporters of progress. In some cases they might serve best as advance men. Being intimately involved with his department's affairs and people, each man can set the stage for changes slated in his department's paperwork traditions. With the organization set up, the attack is launched.

More than one expert agrees that a walk-through survey of your paperwork mess is the first step for your paperwork coordinator. Armed with expandable envelopes and a clip pad, he should walk through each plant department. Follow the trail of the many pieces of paperwork. Collect samples of every form. Mark their purpose, according to written directive and personal interview with those receiving each report. Record the number of persons on each circulation list. The survey should take about two weeks.

The assigned department committeeman should accompany the survey through his area.

Then a kind of value analysis begins. Each committeeman is allowed a few days to analyze his paperwork problems and procedures. He then compares notes with the central manager. Together they spotlight problem areas. They issue a joint statement of objectives—with top management sanction, of course.

Department committeemen take up their control assignments, carry the message of savings and awareness.

Problem areas are generally summed up as reproduction, preparation, handling and distribution, filing, equipment, and stock.

SEARCH OUT THE BEST REPRODUCTION METHOD FOR YOUR NEEDS; THEN INTEGRATE IT

There are 11 copy processes, excluding the old standby of typing carbons. Before taking action you should investigate each one through contact with manufacturers. The types: dry-diazo, moist diazo, blueprint, silver transfer, infra-red, dye transfer, photographic, electrostatic transfer, spirit duplicating, stencil, and offset.

When it's time to choose your reproduction process, use these guidelines:

- A central reproduction and printing shop is needed only if your plant is large enough and integrated enough for volume copying (500-1000 copies a day).
- For every 12 managers you should have at least one desk-top office copier.
- If your engineers create more than 1000 drawings a year, you should consider buying your own microfilming and copy system.
- Your paperwork coordinator should advise and direct the purchase of all reproduction equipment.

TRIM COSTS OF LETTERS AND REPORTS BY TWO-THIRDS WITH "PREPARATION AUTOMATION"

It has been estimated that every letter or report costs about $1.43 to prepare. That is, without using any of the labor- and time-saving equipment available to you today. By using the right equipment and techniques you can cut that cost to 50 cents. On a yearly basis, for a management staff of 20 men, producing five reports a day, you can save over $17,000. Here's how it can be done:

- Design your own report, correspondence, memo forms. Set standards. Make letters shorter—by design.
- Put a retention block on all internal memo and report forms. Require the originator to state how long report should be kept active or filed.
- Centralize typing and stenographic services.
- Use voice recorders and dictating equipment to cut down clerical costs. There are systems available today that allow you to pick up a phone in any part of the plant and dictate on-the-spot reports. Recorded in central dictating area, the tape is handled immediately. The finished report is waiting at your desk when you return from the plant floor.
- Don't use paper at all if a phone call—even cross-country—will do. It's incredible how often managers lose sight of this cost-cutter.
- Minimize supporting detail. Maybe only three pages of a five-page report are essential.

BUY ONLY THE ADP HARDWARE YOU NEED; COMPUTERS ARE EXPENSIVE STATUS SYMBOLS

Automatic Data Processing is another subject worthy of an entire article. One of the best was produced by FACTORY's Roger W. Christian in August 1960. (Reprints, 75¢ per single copy.) From this and other sources, here's a fast rundown of advice for chopping paper-handling costs.

- Make an information systems survey. Start it yourself, but don't neglect a chance to hire an outside expert. Extend the study into every plant department.
- When the time comes, don't go overboard on buying costly ADP equipment. You can rent a fine small computer for as little as $250 a month. Commercial data processing service is available for even less.
- Don't turn to expensive computers and automated paperwork equipment just because "everybody's doing it." Chances are, all you have to do to minimize your paperwork handling is eliminate a few people from the circulation list.
- Every three months attach a questionnaire to each report, requesting information about value and usability. Automatically delete from the distribution list those persons who don't respond to the query within a week.

USE MICROFILM (PLUS A RUTHLESS HOUSECLEANING) TO SLIM YOUR FILES FAST

If the man assigned to coordinate paperwork in his department is attached to his filing system, don't let him survey it. Give the job to someone who couldn't care less about files. Let him tear the system apart, ask stupid questions.

As a general rule, you should not average over two cubic feet of records or files for each staff or office employee. In the shop you shouldn't average over half a cubic foot per employee.

Microfilming can be your ticket to real savings in the file area. It can reduce the space required for records by 98%. There is a film to fit every plant need; from letters and reports to engineering drawings. Investigate 35mm, 16mm, *and* 105mm.

Though some experts advise using microfilm only for paperwork that's almost inactive, recent developments in coding, sorting, and viewing make it possible to put all but the most recent daily reports on film.

Professional microfilm service will be brought right to your plant. Cost is about a penny a frame in volume. Wait until at least 200 pieces are ready to be copied before calling in a microfilmer.

SET RIGID RULES FOR CONTROLLING STOCK AND TO GET THE MOST OUT OF OLD EQUIPMENT

It's a good bet that after you've completed your paperwork survey you'll find need for much new equipment. This should be especially true of telephone-dictating and data-processing supplies. But don't go overboard. You might only have to reorganize and modernize your existing equipment. Determine your equipment needs in general terms first. Then see how far your old equipment will go toward filling the bill. Buy new only where a vacancy exists, or where your old equipment is not right for the job intended.

After you've designed your standard forms and combined similar ones to reduce totals, contact an office-form maker. They may already have a form that matches your needs. It'll save you the special run charge. Wherever possible, use the snap-out carbon package. Non-carbon forms require seven distinct operations to complete the typing process. Sheets interleaved with one-time carbon require only three operations.

Adjust paper quality to suit the job. Use the least expensive paper for all internal communications. Employ better quality for external correspondence, but cut down the size of the sheet wherever possible.

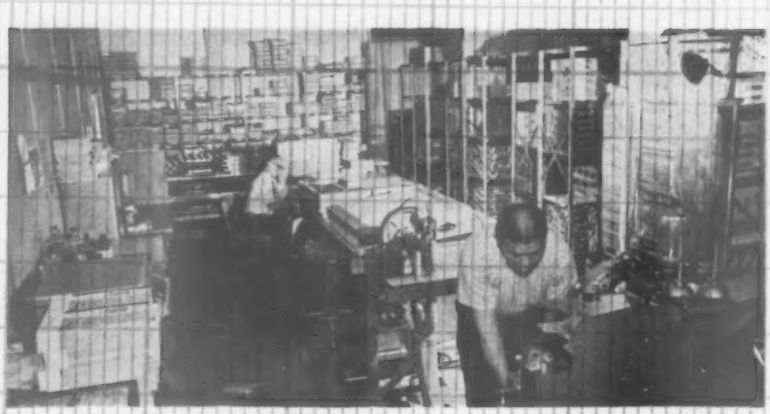
Forms, letterheads, etc., should be printed on a monthly basis. If you have a central stockroom, limit every department to a two-week supply of stationery and forms. This way, form and distribution changes won't catch you with a big inventory on hand. You won't be tempted to put off that form change until after the current supply is exhausted.

Finally, use your paperwork as a *tool* with which to find and cut other indirect costs. Don't use it just for records and reports.

PAPERWORK

A potpourri of cost-cutting cases

IN-PLANT PRINT SHOP PAYS OFF IN MONTHS



Skyrocketing printing costs and delays in printing service prompted Grayson Controls, Long Beach, Calif., to install its own captive printing plant. In operation only seven months, the new publications department of this division of Robertshaw-Fulton Controls Company represents an investment of less than $10,000. Producing 3.5-million impressions a year, annual savings will reach $27,000.

Jobs consist largely of sales and field service bulletins, price lists, and the plant magazine.

Print-shop operation responsibility is vested in two departments: forms control group (a part of the systems and procedures group of the industrial engineering department) and publications department.

Forms control is responsible for: make or buy analyses, forms design, specifications, determination of cost, and authorization for priority work.

Publications department is charged with all print production.

Requests for printing are tightly controlled. All orders (whether stock item or special job) are routed through forms control. Here evaluation includes a function and accuracy investigation and a make-or-buy analysis. Some $3600 has been saved during the last seven months through forms design alone.

A lead time of two weeks is required for all jobs. Most jobs are reordered from IBM control of printing inventory. Emergency project authorization can be given only by general manager or controller.

The publications department is staffed by two men—publications manager and duplicating-machine operator. An artist (regularly employed by the engineering department) spends one week a month producing art and illustrations. Salaries, supplies, and equipment depreciation are the only charges made against the department. No overhead charge is made because print-shop space was formerly used to store purchased print materials.

The department charges out each job according to cost of production. A more accurate pricing standard is being developed by a simplified MTM pattern study. Savings are computed against known outside printing costs.

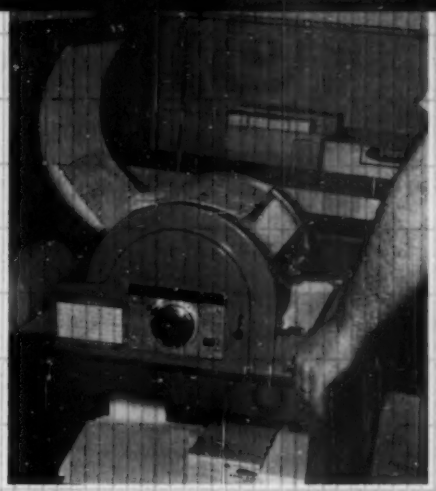
Equipment consists of folder, punch machine, paper cutter, duplicating machine, plate maker, stitcher, and file cabinet.

TAB CONTROL SYSTEM SQUEEZES INVENTORY, SPEEDS PRODUCTION

Encouraged by two years' successful use of tab equipment to project purchased parts requirements, Hewlitt-Packard Company, Los Angeles, is now set to do all its inventory work by tab. In the first six months of 1961 production was up 6.5% over last year. But tab control cut inventory by 4%.

Where the manual job had been a quarterly one, tab equipment permits monthly review. Now, when sales demand a fast check of available parts and production potential, the data are ready within an hour.

Schedules are redone monthly. More and more items are ordered as needed instead of quarterly. Only small, inexpensive items are ordered on a quarterly basis. But instead of asking for half the order in three months, and half a month later, orders are placed on a three-month/six-week basis. This saves two weeks in inventory on hand. And it allows postponement of an order if finished product sales fall off.



DESK-TOP PHOTOCOPIER UPS PRODUCTION-ORDER HANDLING BY 50%

Systematic application of office copying techniques has increased distribution of production orders by roughly 50% at Warren Wire Company, Pownal, Vt.

The company's busy aircraft cable department was often overburdened with orders, many of them labeled "Rush." Handwriting the work tickets individually made it difficult to check work progress.

Rather than make the costly move of adding processing clerks, the company turned to a Verifax Bantam Copier. The desk-top photocopier was tied in to a simplified order posting and filing system.

The old system required an average of one and one-half days to move an order into actual production. Two clerks did nothing but write production tickets—nine to ten handwritten cards for each 5000 feet of aircraft cable on order. Now, by just filling out a single master copy, one person can process an average order in 20 minutes.

Here's how the system works: When a cable order is sent from sales to production control, an expediter turns to a pre-printed 8½x5½-in. specification/production sheet. Specifications are handwritten onto the master order sheet.

Then the customer's name, order number, order size, order delivery date and color is marked on a 2x 3½-in. tab. The tab is slipped into a slot on the master production sheet.

A set of photo-exact copies is then produced on the photocopier for each 5000-ft. lot. Copies reproduce information on the slotted tabs as if they were part of the original production sheet.

After copying, each set of work tickets is placed in a transparent acetate folder. They're scheduled and sent on to the shop. The master sheet returns to the pending file.

PAPER-LIGHT MANAGERS CAN MANAGE BETTER, SAYS FOOD MAKER

The simple practice of eliminating paperwork from the production manager's list of chores is working wonders for Frito-Lay, Inc., Atlanta, Ga., food processor.

The shop's five production managers used to record, calculate, and file all daily and weekly production and inventory figures. They were also responsible for checking out raw materials waiting in the warehouse for delivery to the plant floor.

Now all they do is make a rough handwritten daily count and turn it over to a waiting clerk. The clerk does all the rest—including seeing that each report is delivered to the right plant officer.

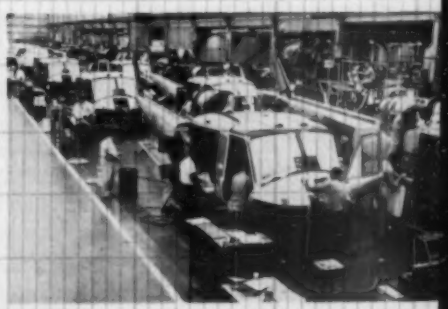
COMPUTER JOGS PRODUCTION, WATCHES STOCK

Since January, Bell Helicopter, Dallas, Tex., has realized a 15% increase in machine-shop efficiency through use of a computer to prepare a daily report on hours spent on production projects.

Bell's data processing group prepares a daily tape run for each operator, and for a given part number. The tape shows the number of parts made by the operator, how long it took him, how long it should have taken, and the difference. The tape is prepared along with a key-punched labor-distribution card for payroll use.

Bell's forms control group runs a continuing program to cut paperwork costs. One of its big problems, being largely a defense contractor, is duplication of paperwork.

"No two ships are ever alike," Bell says, "for the simple reason that we make an improvement in our product every 12 minutes." A backlog can't be tolerated. So the computer is also used around the clock for inventory control.



THE ATTACK ON

PLANT PROTECTION

There's an optimum point between...

Plant protection and safety costs untold millions every year. Losses are even worse. There's a burglary every 36 seconds. Every day of the year:

Over 100 factories are hit or ruined by fire

Employees alone steal several million dollars

There are 5480 lost-time accidents

On top of all this, industrial explosions last year cost another $100-million—and hundreds of lives. Dare you cut costs in this area? Yes. Security and safety are often poorly managed.

expensive security and excessive losses

At YOUR plant . . .

OVER-ALL

What has been the recent trend of plant protection costs?
How do accident and risk ratings compare with similar plants?
Do you use the inspection and advisory services of insurers?
What's the ratio of protection costs to property value? To losses?
When did you last make a personal inspection—unannounced?
Do you depend on accidents to call attention to work hazards?

TO CUT COSTS

Are humans doing jobs that automatic equipment could do better?
Have you weighed economics of contracting for guard services?
Do you know what steps would improve your insurance rating?
Where, and to what extent, are risks less costly than security?
Do you take full advantage of insurance discounts, deductibles?
Is there overprotection due to habit or security featherbedding?
Does your insurer charge less than "rating bureau" rates?

TO CUT LOSSES

How many firemen were trained by experienced professionals?
Is the safety education program planned, budgeted, well-managed?
Has a complete security survey been made in the last five years?
Are scrap and trash disposal tightly supervised and controlled?
Where is the fuel stored for plant and warehouse vehicles?
Do patrolling guards always use the same routes and timing?
What's the reaction time of your fire brigade? (Time it.)
Are emergency crews well trained, drilled, and supervised?
If a guard were disabled on duty, when would it be discovered?
Does personnel make a routine police check on new hires?
Are local fire forces automatically called when fire strikes?

PLANT PROTECTION

How to get more security for less money

Plant protection and safety are not functions you can delegate and forget; not if you want to hold down operating costs. It's easy to think of these functions as peanut items or necessary evils. But precisely because they've been ignored so long, chances are some huge improvements can be made without much sweat—or money. First step: Take a positive attitude. Instead of grumbling that it costs money to prevent losses and costs even more to take them, look upon both costs *and* losses as areas for potential savings.

Plant security embraces countermeasures for theft, fire, explosion and similar hazards, vandalism, accidents, natural disasters, espionage, and sabotage. The list could probably be expanded, but at least the first five are of universal concern.

THEFT—IT'S A THRIVING BUSINESS

Theft takes many forms, from embezzlement and burglary to sticky fingers and collusion. At all levels, too. The purchasing agent of a papermaker in the Midwest built a fine home and "buried" it in the cost of a new plant the company was putting up at the same time. A shoe manufacturer's warehouse people ran a thriving little business on the side—they took their own inventory at the plant.

The solution to this sort of problem is to establish dual responsibility. Make sure transactions and records are checked by a second person. And remember, crimes of this sort are always the work of *trusted* employees, since only they get into positions where fraud is possible. The company is most vulnerable in these areas: the mail room, purchasing, capital expenditure, vehicle and package handling, finished stock, tools and supplies, and scrap and waste disposal.

Management practices are often the plant thief's best friend. For one thing, management very seldom knows how serious theft losses are, because pilferage is lumped in with damage reports. Or paperwork systems are so bad no one knows whether inventory shortages represent theft or just clerical error. For another, remarkably few personnel departments make a routine police check on new hires. Many times a new man lists so many years working for the state, when in fact he was on a penitentiary rock-pile.

Look at your plant through a thief's eyes. He likes congested areas and poor lighting. Plants that suffer most are those with loose tool, supply, and inventory controls, poor communications, low morale, sloppy housekeeping, second-rate supervision. Best of all, thieves like to see loose security measures, inconsistent enforcement, a "friendly" guard force.

Many companies buy false security by not going quite far enough, or by assuming that burglars are all stupid. They wire an alarm to a door and leave the transom unprotected, or neglect to secure elevator penthouses and skylights. Often, watchmen follow the same route every night. You could set your watch—or time an intrusion—by their arrival at each station.

There's a definite trend toward contracting for professional guard services. Costs are lower and you get better protection and fewer headaches. Electronic alarms and central protection services can also cut the need for company cops.

But you can do a lot by just taking an interest. Don't give workers access to their cars during the shift. Make spot checks. Try to walk away with company property yourself. Funnel traffic through fewer gates, lock up damaged goods, set up better records and controls. Every plant manager can:

- Make a security survey to pin down his needs.
- Prepare an over-all security plan and manual.
- Assign responsibility to one man and back him up.
- Insist on good safeguards and strict enforcement.
- Get advice from insurance companies, CPAs, bonding firms, security service companies.

FIRE — PLANNING IS THE KEY

Two years ago, burglars broke into a plant in Michigan and knocked themselves out to open the office safe. When they found only $20 inside, the air turned blue—with smoke. They deliberately set fire to the plant, causing $175,000 worth of damage.

Industrial fires are by no means a thing of the past. There were over 40,000 of them in 1960, and this year may well be worse. They happen to large, well-managed companies, too. This June, fire demolished a Joy Manufacturing plant. Loss: $5-million.

Small or young companies are much more vulnerable. For them, fire is more likely to be a mortal blow, as customers and employees turn to other firms while records, dies, and facilities are being replaced. And small plants often have only minimum protection.

Plants in rural areas face special fire hazards. Small-town fire departments may not have the men, equipment, and experience to cope with major factory or warehouse fires. They may take too long to reach the scene. The

local water supply may be inadequate, especially if the fire gets a good head start. Finally, poor road maintenance can give the fire a hopeless advantage.

With proper planning, you can overcome almost any disadvantage. Without it, even elaborate equipment won't protect you—a few years ago, a fire-extinguisher factory burned to the ground in a large city.

A logical place to start is to know your hazardous areas. Awareness and preparation make all the difference. The fire squad should have a map of hazardous areas, and should know it by heart. But *every* employee should be trained to recognize fire hazards. Each must also know how to react to fire. *Panic is easily the most serious hazard involved,* since it can defeat the organized response. Don't restrict fire education to the auxiliary fire brigade. Carelessness—a hot soldering iron, clumsy maintenance work in a paint spray booth, oily rags in a box under the stairs—causes tragic fires every year.

Sloppy management, too, causes serious hazards. At one plant, workers siphoned the gas out of a fire pump, but it wasn't noticed until too late. Entire factories have been blown apart by the explosion of dust in the air ducts. Is lift-truck gas stored in your plant or warehouse? A gallon of it packs the wallop of 83 pounds of dynamite.

Automatic sprinkler systems offer excellent protection —when they're operating. Insurance savings alone should pay for the installation in five years or so. But fire has leveled plants with full sprinkler systems—that were inoperative. Last year, ADT spotted 71,000 cases where valves were shut off. Sprinkler heads have been painted shut, the plumbing clogged by everything from fish to golf balls. This summer, at a plant shut down for vacation, maintenance welders touched off a fire just as the plumbers turned off the sprinklers.

Suppose you have sprinklers and your work force is fire-conscious. How else can you cut costs? First, set up auxiliary fire brigades. Organize them so that each area is covered, preferably by men who work there all the time. And don't be satisfied with a token group on the second and third shifts. See that each man is given *specific* responsibilities, so no vital task is neglected in the excitement. Hold fire drills and make them realistic. Plan alternate evacuation routes. And if you employ women, appoint "wardens" to guide the exodus.

Be sure the fire alarm is easily distinguished from the general shop din. Bleed static electricity away from machines by grounding them to a water pipe or a buried plate. Make sure fire equipment is inspected weekly.

DETECTION — TIE IT ALL TOGETHER

An effective, economical way to get better protection from both fire and intruders, and often save big money into the bargain, is to tie your detection devices into a central security service such as American District Telegraph (ADT). They keep the systems constantly supervised and operative. Signals are investigated at once, and maintenance is reliable. If a sprinkler head lets go, a water flow alarm is flashed and the fire department is on its way, perhaps before anyone at the plant discovers the fire. Intruders are often caught red-handed.

A good, monitored system of electronic burglar alarms may eliminate the need for plant guards entirely. Or ADT will supervise your watchmen to make sure they're all right and on the job. Last year, ADT found over 200,000 situations in which watchmen didn't report; 1100 were disabled, 1500 had fallen asleep, etc. In each case, a quick response restored security in jig time. Important? The insurance discount for supervised guards is three times that of unsupervised guards.

The combination of lower guard costs and lower insurance for supervised systems adds up fast. McKesson & Robbins, Inc., has all its distribution centers wired into ADT, and estimates the annual savings at well over $600,000 a year. The service firms also monitor temperatures and critical equipment such as paint mixers. Supervised sprinkler systems alone can slash fire insurance costs up to 90%.

SAFETY—IT NEEDN'T BE COSTLY

Cutting the costs of safety without cutting safety itself boils down to working harder with your head than with your vouchers. For instance: In any sizable operation, it will cost more to hand out safety pamphlets than to show movies, yet the films have much greater impact. Make it clear that safety is important to *you.* Hang noisemakers on quiet plant vehicles. Use mirrors at blind corners, bench-level conveyors to cut lifting. Give supervisors full safety responsibility. Hold contests so workers make their own safety posters. Use humor and employee photos on posters to hold interest. Get help from organizations that promote safety.

INSURANCE — WORK YOUR RATES DOWN

Insurance costs can be trimmed in a number of ways. With a few exceptions, insurance rates don't take into account individual loss experience. It's the over-all experience of a broad classification that counts. To work your rates down, accumulate credits for favorable physical features—never mind the past record. Improve plant protection so you qualify as a "superior risk."

Ask for a re-rating if improvements have been made since the plant was rated. If you've cut up large areas, isolated paint spraying, improved waste containers, make sure the underwriters know it. Remember that insurance brokers may not be too aggressive about noticing these things or making suggestions. A fat premium may mean a fat commission.

Don't hesitate to shop around for a lower rate. Factory Mutual Companies, for example, only take on high-caliber risks, so their rates are lower than those of conventional "rating bureaus." Take advantage of any discounts you can get, too. Tight auditing controls are worth 20%, alarm systems up to 70%.

Boiler and machine insurance costs can also be cut—perhaps substantially. Make a careful risk analysis and pick out risks you can absorb yourself. Keep an eye out for insurance values that have changed. Use a deductible. When putting in new gear, use separate units where possible. The premium on two 5000-kw. turbogenerators is less than on one of 10,000 kw. (because the likelihood of full production loss is less). Make full use of the accident prevention and inspection services of insurers, too. One routine check of a pulp digester revealed a hidden circumferential crack that could have caused a $250,000 accident.

PLANT PROTECTION

"A few guards, some sort of safety campaign, a fire brigade, and some insurance—peanuts." Don't kid yourself. The savings may surprise you.

Plant protection and safety costs are down 50%, thanks to a comprehensive program begun in 1956 at Helicopter Division of Bell Aerospace Corporation (Dallas). In less than five years, the guard force has been cut from 57 to 33, thanks partly to automation. For example, it used to take four men to guard the warehouse —one for each shift and an alternate. Now, with automatic security equipment, the building is remotely monitored. Guards can get there in a flash.

Other aspects of the guard-reduction program include "simple things like eliminating gates" and constant policing of guard schedules to get maximum protection out of every man. In addition, protection of both company property and defense projects has been enhanced by a well-run program to educate all employees to the value of proper security, and through the new volunteer security committee.

Backing up its automatic fire detection systems, the Bell plant has two large and two small fire trucks, plus a completely equipped crash jeep. The fire chief is sent to Texas A & M every summer for a brush-up course in firefighting, and to master new techniques and equipment. In addition to 11 regular firemen, the plant maintains a well-organized and trained group of 100 volunteer firemen, including both hourly workers and high-level supervisors. There is at least one fire drill a week. Volunteer firemen are identified by a red strip on their plant badges, and are drawn from all three shifts, for 'round-the-clock availability, 7 days a week. A formal report and a complete follow-up is made after every fire, no matter how small. Fire prevention is a way of life.

The Bell plant also has an extensive safety program. Here again, costs have been reduced while the scope of the program has expanded. One major economy was that of standardizing on safety equipment and placing it only where really needed. This step also provided improved control. Two full-time safety engineers work with plant engineers to head off hazards, and line supervisors carry direct responsibility for enforcing and improving safety measures. A constant, intensive safety education program makes full use of posters, inserts in pay envelopes, and the like.

Relocating time clocks solved a number of serious plant security problems at a large metalworking plant in the South. Before, time clocks were scattered in a dozen places around the plant. Employees punched out and could either join a flood of others pouring through large gates, or could go directly to their cars, then drive out through the main gate. Pilferage was completely out of control, and time—a costly item—was being stolen in wholesale lots. Employees were able to knock off half an hour early by arranging for a friend to punch them out.

The solution was cheap and effective. The number of time clocks was slashed 80%, and those remaining were set up at the main gate. All employees now have to punch out, go through a small gate, and pass a guard before leaving the premises or going to their cars. Guards allow no punch-outs before the shift change, and make sure no one punches two cards.

Automatic fire and burglary protection through ADT central-station service has long been saving better than $32,000 a year in guard costs at Polaroid Corporation (Cambridge, Mass.). The sprinkler supervisory and waterflow alarm service automatically summons the fire department whenever the system operates, and keeps a constant, automatic check on shut-off valves and other water supply conditions. Sensitive, monitored equipment instantly detects intruders or any attempt to neutralize the system. Both police and ADT guards respond to alarms, usually before the intruder knows he has been detected. Finally, steam pressure and various heating conditions are automatically supervised.

A bonus of such a system is that it results in a substantial drop in insurance costs.

Switching to a contract guard service brought savings of $25,000 a year to Standard Pressed Steel Company (Jenkintown, Pa.). Like most company guard forces, Standard's was made up of men past their physical prime. Over a third would retire inside of two years. Most had more or less gravitated into the job. Besides the main plant, several outbuildings had to be protected, including a subsidiary plant and a warehouse, each several miles away.

After a survey of the situation, Pinkerton's National Detective Agency (Hq. N. Y.) offered to take over the security function at a per-man-hour cost 30% below what Standard was paying its own guards. Savings stem mostly from the elimination of outlays for uniforms, equipment, and fringe benefits.

The benefits of contract guarding go far beyond lower costs, though. The company has no more scheduling headaches when a man is ill or on vacation. The new guards are professionals, not under social pressure to wink at infringements of safety regulations by "fellow workers." Or to look the other way when a big shot decides to take home a few samples. Misfits can be quickly replaced, and there are no disciplinary or collective bargaining problems. These and other benefits add up to better protection at lower cost.

A $90,000 annual saving resulted from General Electric Company's use of electronic burglar alarms in six buildings near its Electronics Park (Syracuse, N. Y.).

Not sure certain activities would be permanent, G-E housed them in the six leased buildings, a 15-min. drive from the main facility. Full-time guard protection—a man at each building, three shifts—would take 18 men, and cost $100,000 for payroll alone. Instead, the premises are protected during "closed" hours by electronic devices wired into the main guard station at Electronics Park. Photoelectric systems cover large open areas. King-sized versions of the "electric eyes" that open supermarket doors (except that they use infra-red light), the systems criss-cross large areas with invisible beams. By cutting a beam an intruder sends a silent alarm to the guard station.

Smaller or broken-up areas are protected by ultrasonic systems, which flood the areas with inaudible sound. Anybody passing through the area alters the frequency of the system. Again, a silent alarm is flashed to Electronics Park, and the marines are on the way. Any tampering with the wires of either system also signals an alarm. A panel at the main guard station identifies the location of the signal. Sound expensive? The whole shmeer paid for itself in salary savings *the first month.*

No sprinklers could be used to protect the corporate records of American Cyanamid Company (N. Y.), since water could be as destructive as a fire. The solution is a system that automatically detects fire by the rapid temperature rise, sounds an alarm, cuts off the ventilators in the room, and smothers the fire with carbon dioxide gas. The gas won't damage the documents, and after ventilation is restored, the gas disappears into thin air, leaving no mess to clean up.

Closed-circuit television (*above*) keeps an eye on traffic at The Kordite Company (Macedon, N. Y.). The rear gate—now unmanned—serves the receiving department, and is kept locked. When a truck approaches the gate, a TV camera picks up the image and shoots it to a receiver in the manned guardhouse at the other side of the plant. A two-way intercom system permits the guard and the trucker to talk to each other. By remote control, the guard can open the gate when he's satisfied that the situation is normal. Besides cutting down on the time involved, and eliminating the need for manually operating the gate for each vehicle, the system expedites traffic, gives tight control.

The average total cost of industrial accidents is $2000 *apiece.* By this yardstick, the Jersey City (N. J.) plant of Colgate Palmolive Company hit real paydirt when a training program for supervisors cut lost-time accidents by a whopping 36%.

Railroad seals have cut theft losses almost to zero at a large defense contractor's plant. In spite of an elaborate security system, certain desirable items managed to walk away. An alert government inspector noticed that loaded trucks were inspected at the shipping dock, then sent on their way. What was to prevent them from stopping on the way to the gate, taking on a few contraband items, and driving out? He started sealing the truck doors after the loading-dock inspection. The gate guard inspected the seals. Losses dropped at once. He then took to sealing railroad cars as soon as they were emptied. The guard at the siding gate checked, then pulled off the seals as the cars left the premises. Losses stopped cold.

Traffic safety has been improved by an artificial bump at Union Carbide Corporation's new plant in Marietta, Ohio. The bump extends across the plant road, near the main gate, effectively discouraging lead-footed drivers.

THE ATTACK ON

QUALITY CONTROL

Are you in the red on Quality

Each **NO** *means money down the drain*
Each **YES** *means economical and efficient Q.C.*

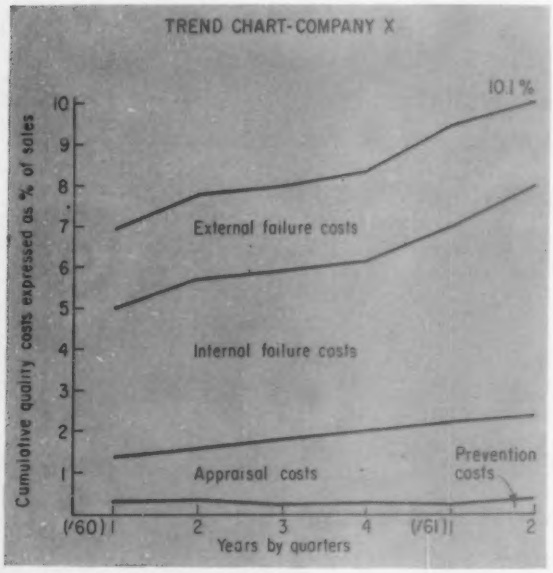
	Yes	No
Do you use statistical Q.C. instead of less efficient 100% inspection?	☐	☐
Is Q.C. responsible for improving quality rather than just inspecting? ..	☐	☐
Is Q.C. responsible for raw materials meeting specifications?	☐	☐
Can Q.C. stop production if quality falls below a certain level?	☐	☐
Is Q.C. safe from being overruled by department heads?	☐	☐
Do you have vendors certify their materials as meeting specifications?	☐	☐
Have you a vendor rating program?	☐	☐
Are customer complaints forwarded to Q.C. instead of departments?	☐	☐
Are complaints evaluated as to per cent defectives, cost, and lot?	☐	☐
Do specification control charts prevent processes getting out of hand?	☐	☐
Do you separate avoidable from unavoidable scrap?	☐	☐
Have you inspected and studied production salvage operations?	☐	☐
Do you compare scrap-generation ratios with the industry average?	☐	☐
Does accounting provide for scrap, spoilage, and rework reports?	☐	☐
Have you analyzed costs by major types of defects found?	☐	☐
Have you regular collection and disposal procedures?	☐	☐
Have you physical control of scrap leaving the plant?	☐	☐
Have you considered every means of using rejected materials?	☐	☐
Do you get frequent competitive bids from scrap dealers?	☐	☐
Will your vendor offer a better price than your scrap dealer?	☐	☐
Do you pinpoint spoilage as to equipment, operator, or methods?	☐	☐

Control? This checklist will tell you.

Do you emphasize the important elements of waste for employees?	☐	☐
Are employee training and instruction methods adequate?	☐	☐
Are lighting conditions conducive to precision work?	☐	☐
Are operators safe from irritating vapors or dust?	☐	☐
Are simplified test gauges being used?	☐	☐
Are you using infra-red spectrometers to speed quality analyses?	☐	☐
Are you using automatic inspection on multi-step machining operations?	☐	☐
Are you using optical comparators to reduce inspection cost?	☐	☐
Are you using ultrasonic test equipment?	☐	☐
Does product have sufficient protection to prevent handling defects?	☐	☐
Do you use value analysis to reduce cost and increase reliability?	☐	☐
Do you check product design to see if reliability can be increased?	☐	☐
Does cost of quality exceed customer needs?	☐	☐
Do you check accuracy of your inspectors and their instruments?	☐	☐
Are you using audio-visual aids to improve operator skills?	☐	☐
Do you use learning curve analysis to single out poor learners?	☐	☐
Do competitive programs reduce scrap on three-shift operations?	☐	☐
Are night supervisors receiving the same training in Q.C. as day men?	☐	☐
Is a second sample submitted for analysis when the first is rejected?	☐	☐
Is lab equipment periodically checked by sending test samples outside?	☐	☐
Does Q.C. perform machine capability studies to test machine reliability?	☐	☐
Does Q.C. have sole say in whether or not a product meets specifications?	☐	☐
Is Q.C. informed of all process changes?	☐	☐

Q.C. savings don't come easily. It takes

IDENTIFY THE TOTAL QUALITY PROBLEM



By **W. J. MASSER**, Manager, Quality Control Eng. Services
General Electric Company, New York City.

To control the cost, direction, and effectiveness of a quality control program, you must be able to identify the total quality problem rather than bits and pieces of it such as inspection or scrap costs.

The following four-step approach provides an ideal means for looking at the whole problem:

1. Summarize quality costs into four categories

- Prevention costs—those incurred to prevent future occurrence of defects; e.g., quality engineering and administration, development of test equipment, process variability studies, quality training.
- Appraisal costs—those incurred to assure conformance with quality standards; e. g., test and inspection.
- Internal failure costs—those generated by defective products; e.g., scrap and rework.
- External failure costs—those generated from defective products being shipped to the customer; e.g., complaints and product service.

ENGINEER TO REDUCE INSPECTION NEEDS

By **M. B. LINDQUIST**, Manager, Quality Control
Small A. C. Motor & Generator Department
General Electric Company, Schenectady, N. Y.

To reduce appraisal costs, reduce your inspection requirements. Engineering in provisions for increased quality will produce a less defective product, thus reducing the need for inspection. This can be done with a four-pronged approach:

1. Provide the proper setting

- Establish an Incoming Material Program so the operator has the right kind of material and the proper quality on which to work. This will lessen the chance of producing scrap and rework.
- Make machine and process capability studies. These will help you determine which machine tools are capable of holding the required tolerances. More selective use of equipment will guard against inherent defective production.

sound planning coupled with sound engineering.

2. Develop trend charts for the above costs

Express the above costs as a per cent of sales and plot them graphically every three months on a time axis. See example at left. This establishes past performance and presents facts for future planning.

3. Draw conclusions from these relationships

Analysis of these trend lines permits a logical review of the costs from the standpoint of comparing the money invested in controlling quality with the results achieved. Management may see at a glance any imbalance among the four areas. For example, the following conclusions can be drawn from the graph at left:

- Little preventive work is being done.
- Scrap and rework have increased at an alarming rate.
- Appraisal costs have increased to prevent this defective work from being shipped.
- External failures, although too high, have been held constant because increased inspection is catching more defective work in the shop.

Conclusion: Management must redirect its efforts to prevention to reduce these high costs of failures.

4. Make the quality engineering effort the core of the quality program, using cost analysis as a guide.

Inspection and testing activity of and by itself can no longer cope with the quality needs of today's products. Technological advances, and product and equipment complexities force the need for strong quality engineering effort (prevention effort) that must concentrate on the following:

- Preplan all the quality needs of manufacturing prior to the production of new or modified designs.
- Set necessary product standards (at the design stage) for quality characteristics—especially those concerning finish, color, noise, and vibration.
- Issue inspection and testing instructions to inspectors and line personnel.
- Study and make available manufacturing capabilities to engineering design; work with design engineers to dovetail new designs with these capabilities.
- Establish fast feedback channels to manufacturing to learn quickly customers' acceptance reactions.
- Use quality cost analysis for seeking out problem areas and for instituting cost-reduction programs.

2. Equip the operator with quality control tools

- Provide quality instructions in conjunction with machine operating instructions. These will help the operator to make the part right the first time.
- Give the operator a characteristic checking gauge at his work place. Such a gauge is zeroed in with a fixmaster ground to the nominal dimension to which the part must be held. The operator sets his machine so the gauge reads zero, thus building a normal distribution around the nominal value. This gives the laws of probability a chance to operate. Photo (left) shows an operator using this type of gauge to check the size of a shaft being turned on a tracer lathe.
- Have the operator maintain his own control charts. This will detect defective trends during the production cycle, allow corrective measures to be taken.

3. Build quality control into the machine

- Engineer into the machine the type of controls that take advantage of certain design characteristics. These controls will not allow a faulty part to process to the next operation. For example, one manufacturing engineering department designed a rotor shaft press which locks the rotor into a fixture. The shaft is pressed in at maximum allowable tonnage, then checked with minimum tonnage. The rotor cannot be removed until the check has been completed. Built-in controls such as these insure perfect production.
- Engineer holding devices that prevent damage to the product while being worked on. These can also be used as checking jigs to detect any misalignment of mating parts before assembly.

4. Replace inspectors with quality auditors

The above measures will build in an increase in the level of quality, thus decreasing the need for inspectors. However, management control can still be maintained by having quality auditors perform in-process audits at regular intervals to assess the level of quality conformance throughout the plant.

QUALITY CONTROL

Everyone talks about Q. C. costs. Here

RELIABILITY ASSURED AT A GLANCE

Shadowgraph at Frigidaire, Dayton, magnifies a tiny screw 20 times, makes nine-dimension check in a fraction of the time it used to take. Formerly done by hand, inspection was time-consuming. Inspectors were limited to the number of parts of each shipment they had time to check. Now greater samplings are made, thus insuring greater quality control. The projector is made by Jones and Lamson Machine Company, Springfield, Vt.

$100,000 PER YEAR

Grumman Aircraft Engineering Corporation, Long Island, N. Y., has saved that much this year with its new ultrasonic testing lab. Sheet metal and missile materials are tested in the 36x12-ft. tank shown above. The ultrasonic scanner sweeps over the material; defects show up on an oscilloscope. In one 10-day period, this testing facility identified 30,000 pounds of material that didn't meet designers' specifications.

VACUUM SPECTROGRAPH SAVES AN HOUR OF FURNACE TIME EACH DAY

Six minutes is all it takes for a direct-reading, vacuum spectrograph to check the metallurgical balance of steel at Atlantic Steel Company, Atlanta. Before this, the furnace had to be held at top heat for 20 minutes while a man in a jeep rushed a tap sample to the lab for analysis. Now, 11 elements can be checked instead of 5 and all the elements can be charted. Payoff time for $60,000 machine: two years.

ıre eight plants that do more than talk

33 TIMES MORE EFFICIENT

10,000 parts an hour are quality-checked for length in this vibrating machine, operated by a single man. This same 100% inspection of rubbing blocks for automotive ignitions used to be done entirely by hand at the rate of 300 per hour. Designed by Synthane Corporation for its plant in Oak, Pa., the machine has a vibrating hopper, a measuring gauge, and a counter that records the number of accepts and rejects.

MINUTES INSTEAD OF HOURS

Ultrasonic baths reduce washing and checking time for subminiature ferrite parts (used extensively in the electronics industry) from 1¾ hours to 1¾ minutes at Irvan Engineering Company, Van Nuys, Calif. Checker gives parts two baths, first in acetone, then in deionized water. This completely cleans and decontaminates them prior to packing. Before, each part had to be hand-dipped into four different solutions.

WORK SAMPLING PAYS OFF THREE WAYS

The quality control director of a large West Coast plant admits that management had only a foggy idea of what it expected from its men who inspected incoming materials. They conducted a work sampling study. It showed: (1) The per cent of vendors' parts inspected could be reduced without affecting quality; (2) Manpower could be reduced 6%; (3) Overtime, which had been running much too high, could be cut.

INSPECTION COSTS REDUCED BY 30%

Graphite event recorders at Controls Company of America, North Manchester, Ind., do the trick. They chart the electrical characteristics of more than 100 different washer, dryer, and dishwasher timers. Each chart is compared with that of a "perfect performance" plastic overlay. If they're identical, the timer passes inspection. The recorders are made by Esterline Angus Instrument Company, Indianapolis.

AUDIO-VISUAL AID BOOSTS PRODUCTION OF ELECTRONIC ASSEMBLIES

A 40% increase in production of complex electronic assemblies is the result of a new audio-visual aid at General Dynamics Corporation, Pomona, Calif. The unit has a tape recorder which gives a step-by-step narrative of assembly procedure. Each step is visually presented by color slides. Speed of slides and tape is controlled by operator, who thus sets his own pace. Hughes Aircraft Company, Los Angeles, makes the aid.

THE ATTACK ON

STAFF SERVICES

Use these questions to shape your plans

PRACTICES

How often do staffers meet with plant top management?
Do staff groups regularly participate in meetings with line organization?
How often does each staff group hold closed meetings?
Are there regular inter-group meetings among staff?
Are there too many or too few meetings involving staff?
Are staff meetings too long?
How do staff groups communicate on projects of mutual interest?
How good is communication between line and staff?
Do staff groups regularly report activities?
Are staff project reports adequate for decision and action?
Is staff well informed on company plans and actions?
Are you satisfied with telephone methods and costs?
Are your specialists contributing a service every day?
Do staffers know why they're at each meeting?
How much staff work is ego-satisfying rather than essential? Ask somebody else.

PERSONNEL

What per cent of staff people have been "retired" to present positions?
How many of your engineers are registered professionals?
Do you have a recognized training program to upgrade staff personnel?
Do staff people participate actively in technical and professional societies?
Do they attend trade shows and conferences?
What is the rate of turnover in staff groups?
Do staff personnel have promotional opportunities?
Are staff salary scales competitive?
Are you planning to recruit against long-range needs?
Are staffers properly assigned according to their skills?

ORGANIZATION

Do you have more or fewer staff departments than you had three years ago?
Can the number of departments be consolidated?
Could appointment of a manager of all staff groups lead to over-all economy?
Is there duplication or overlapping in the work of staff groups?
How often do you employ consultants for special projects?
Have you had a management consultant survey your staff?
Do your staffers complain about lack of status?
What's the ratio of full-time management personnel to all others within the staff?
What's the ratio of specialists to purely clerical?
Are staffers doing jobs that might better be contracted for?

EFFECTIVENESS

How good is line cooperation with each staff group?
What per cent of their time do staff groups spend *selling* ideas and services?
Are staff groups located in relation to areas they serve?
Does each staff group have adequate space in which to work efficiently?
Are staffers properly equipped with furniture and tools?
Are lighting, noise level, etc., conducive to good work?
How high is line confidence in staff performance?
Is your staff cutting its own costs as well as those of the line?

MEASUREMENT

Is the ratio of staff to total employees going up or down?
How much does each staff group contribute to plant cost reduction?
Have you made work sampling studies of your staff?

Do staffers set and meet project deadlines?
What is the ratio of active and inactive projects?
How much backlog does each staff group have?
Does management regularly review project lists?
What is the ratio of important to unimportant projects?
What is the ratio of short-range vs. long-range projects?
Are staffers meeting their projected savings goals? How often?
Who audits project results and verifies them to top management?
What is the ratio of staff service costs to sales volume?
Who determines need for staff services?

STAFF SERVICES

Cold appraisal and bold action are

NEED FOR EACH MAN MUST BE JUSTIFIED

Start with the bare bones. When we talk of staff services we're talking about nothing more or less than people—people that don't contribute directly to the production process.

Make a list of all your staffers. Put boxes next to their names. Check the ones absolutely essential to the company's survival *tomorrow*. You can operate without the rest. But unless you're in dire financial trouble, you won't. You'll determine who's essential to growth, to support of direct labor, and to maintenance of proper customer relations.

If you're not already doing it, measure work load, output, and quality of performance for a three-month period. Now set standards and rate your staff against these figures. To make these measurements, try work sampling or a system like IBM's performance evaluation (FACTORY, September 1961, page 117). List the best men in each department in descending order. Clip off from bottom of the list until you have a ratio of two men doing the job that three used to do. This "Polaris concept" used by the Navy sets up shorter, crisper lines of authority and communications (see page 138).

From then on make performance checks at least every six months. This way lagging output and quality won't get out of hand. Slipping staffers can be notified in time to make improvements and changes.

With a solid understanding of the problem in mind the lagging staffer then has six months to improve. Failure to do so means reassignment or dismissal.

A well-engineered system of financial reward for top performance, supported by a sensible benefit program, justifies a taut staff system like this.

Now that you have a trim, eager staff, how do you help them keep costs in perspective? The answer: Attend carefully to their equipment and operational needs.

GOOD EQUIPMENT YIELDS SMARTER WORK

Start with office layout. As a plant manager you may know the whole book on production flow and shop layout. But chances are you're not so expert at efficient arrangement of desks, chairs, and walls.

Manufacturers of office equipment usually provide free layout advice to their customers. Another source of help is the National Office Management Association, Willow Grove, Pa. Once you've determined the needs of your staffers, use this service.

Strive to give every man a desk of his own. Discuss with him his space needs. Determine a realistic requirement and try hard to meet it.

Since most staff people work seated, spend a little more for a comfortable chair. An uncomfortably seated man spends more time squirming and walking around than he does working. Consult your plant physician on this one. He'll give you specifications that can then be matched up with available products.

Supervisory staffers need a certain amount of privacy. A seemingly insignificant thing like a portable wall can help an unsure supervisor to become an aggressive, efficient manager.

Telephones should have nothing to do with status. They should be assigned instead according to absolute need. Speaking of telephones, highly effective new communications systems are now available from your telephone company and electronic equipment manufacturers. Ask their help in setting up a phone system that will suit *your* requirements.

Regardless of the size of your engineering department, your engineers will work better and faster with the best equipment. Start now to check light levels, drawing boards, drafting machines, stools, and miscellaneous equipment.

POOR COMMUNICATIONS CAN BE CRIPPLING

Staff people have as difficult a time (sometimes even more difficult) recognizing their contribution to the company product as do production workers. It's absolutely essential that they be kept well informed about management policy, plans, and actions. The staff advisory function needs regular information if it is to work effectively.

Information of this kind can best be disseminated through a bi-weekly or weekly newsletter. Simple in format, and relatively easy to prepare on 8½x11 paper, a newsheet such as this takes on the aura of an "insider's letter." It makes the staffer feel he's in on plant decisions and operations from the ground up. It stimulates his enthusiasm and spirit.

Staffers should be encouraged to participate in various

vital to checking staff costs

community affairs, politics, and charitable drives. In outside activities like these staff people have a chance to learn and to try out management skills and ideas they might apply in the plant. It's a perfect no-cost training ground for staff people.

The greatest waste of time in most plants is the staff meeting. Most end up as long-winded bull sessions or discussions of special problems unrelated to those of the group.

To get the most out of your staff meetings, enforce with vigor a one-hour time limit on all meetings. Though this may sound arbitrary, it's a good round figure easily understood by everyone. The first few times you adjourn the meeting after only one hour of gab, you may find a few staffers have not been heard. Each man will soon realize every word he contributes must be packed with meaning and purpose.

In addition, remember these tips for holding productive meetings:

- Plan to solve a problem—not hold a meeting.
- Use the meeting as a tool.
- Don't tolerate late attendance or interruptions.
- Announce the meeting at least 48 hours ahead.
- Be specific about the reason for the meeting.
- Tell each man attending why he's invited.

MANPOWER LEASING AIDS FLEXIBILITY

You'll find more than secretarial help at your nearest manpower leasing agent. Larger, more reputable agencies like Manpower, Inc., have everything from stenographers to draftsmen and physicists.

If you're in a fairly large industrial market, it's often wise to check leasing facilities—before you start your staff analysis. This way you'll know whether you can cut back staff without fear of replacement problems when business improves, or in an emergency.

When you're forced to make a staff cut, a good leasing agency can help in easing a man *away* from his job. If accepted by the agency he will have a good temporary job until he can find a more important spot elsewhere.

Economy is built into manpower leasing. You get reliable, skilled staffers almost without a string attached. Since their wages and benefits are paid by the agent, you have no training problems or administrative headaches such as payroll paperwork.

TOO MANY EXPERTS CAN SPOIL THE STAFF

The care and feeding of the staff specialist is a complex and expensive thing. For this reason the plant with fewer than 1000 employees should, as a rule, steer away from him.

Specialization in a single phase of the manufacturing process is necessary only where that phase is vital to the success of *every* production goal. Where it is required, be certain the specialty is adequately backstopped with one or two "specialists-in-training."

Train your staffers to be skilled at several specialties. Try rotation of assignments, even with the more senior members of the staff.

One of the best ways to cut down on staff costs is the skillful use of consulting services. These provide special staff talents only when needed. There's no salary or benefit load to carry the year round.

When you need a consultant, buy his services with the same discretion that you purchase capital equipment.

SOUND TRAINING BUILDS SOLID RESERVE

There's more to staff training than meets the eye. Money spent wisely on a continuing training program can save you great sums by giving you better staff people and reduced turnover.

Training is more than a six-month indoctrination. A good program should be designed to broaden every staff man's interests. It should develop abilities to interpret problems and come up with solutions of real value to line managers.

A good program should include company-sponsored studies at a local college and attendance at certain professional seminars, as well as in-plant courses. Training needs and accomplishments should be reviewed by management semi-annually.

When your staffers attend professional workshops and seminars, be certain of their intentions. Require written reports and observations based on the session. Ask your man to either recommend or reject similar sessions for fellow-workers. Limit attendance to one or two a year per man. Encourage regular attendance at local professional meetings. This "free" exchange of ideas can pay big dividends with the cost of membership dues the only cost to the company.

The attack takes smart use of

POLARIS PLAN PAYS OFF

The successful firing of the stubby ICBM at right proved without question that a lean, hungry staff team can lick the complex problems of modern industry.

The Polaris staff concept, as it has come to be called, put the 28-ft. bird in operation by November 1960, two years ahead of schedule.

The system insists that one good man do the job of three. The objective is to (1) shorten the lines of staff communication, (2) put fewer fingers in the "project pie," and (3) enable smarter, faster decisions by every manager.

In industry the concept is gaining favor, especially among defense contractors. Here, narrow profit margins and slow return on investment demand action like this. But other companies, like Parker-Kalon, are also using the principle successfully.

COLOR-KEYED MACHINES SPEED ENGINEERING TASK

Blue machine tools and an engineering pool are saving time, money, and frazzled nerves for staff planners at Hewlett-Packard Company, Los Angeles. Only development engineers may use the pastel-colored machines in the prototype shop.

According to H-P, the "blue area" assures an engineer that he'll get a crack machine whenever he has to make a fast modification of a prototype part. Since the prototype shop machinist is a special man he doesn't need complex drawings or other paperwork required by the manufacturing area machinists.

The engineering pool is also a feature of the development engineering department. Into it plunge a number of promising college students. On a part-time basis, these young men are assigned short-term jobs that ordinarily consume valuable engineering time.

Students benefit, of course, from exposure to the work they've decided to practice. The company profits (1) from lower drafting costs and (2) from being able to screen future employees at close hand. Long-range recruiting plans are based on these observations.

MANPOWER LEASING SAVES TRUCK MAKER $100,000 PLUS

Supported by savings of over $100,000 a year, manpower leasing is now firmly entrenched in the management scheme at Baker Industrial Truck Company, Cleveland.

For two years Baker has hired 300-400 persons from Manpower Inc. to handle the plant's annual physical inventory. The only Baker personnel on hand during the inventory are a few supervisors from the salaried and factory group.

Before using Manpower, Baker took inventory with its own people. This meant closing the plant down for about a week—in addition to the annual two-week closing for employee vacations.

Now the job is done in three days *during* vacation time. Baker figures savings at over $100,000 in terms of production regained. Dollar savings in salary and benefits amount to about one-third the cost of paying regular employees.

The first year Baker tried leasing it found 90% of the Manpower people satisfactory for the job. This year the figure was 100%. Most of Manpower's workers are high school and college youngsters.

Baker also subcontracts regular janitorial work, such as sweeping, dusting, and window and toilet cleaning. Savings here of 12% over normal costs have prompted the company to consider subcontracting still more housekeeping work.

concepts, equipment, and outside help

FACILITIES SURVEY CUTS DRAFTING COSTS

An intense and successful campaign to cut drafting costs at General Electric Company plants turned up these highlights, according to Robert F. Franciose, engineering services consultant for the company:

- Improved output and working ease from 90-deg. reference tables behind draftsmen.
- Faster production from drawing machines that replace ordinary straight edges.
- Optimum working efficiency from use of proper chairs with adjustable seat heights.
- Better production from accessories such as electric erasers, mechanical pencil pointers, lead holders, and polyester drafting film.
- Faster production from strategic placing of engineering information centers in drafting room itself.
- Improved attitudes and efficiency from better lighting, ventilation, and color-keyed interior décor.

TOUGH RATIOS, NEWS PHONE GIVE MORE FOR STAFF DOLLAR

Smart use of management fundamentals and existing equipment can mean big payoff in the fight to get more for your staff services dollar. At Pacific Car and Foundry Company, Seattle, strict devotion to preestablished personnel ratios brings this payoff.

Through various work measurement techniques and profit/expense comparisons, a ratio of direct to indirect employees is set for each plant department. At end of each week managers get a tabulation of employment levels in each area. When figures are out of line with the base, managers want to know why.

If the change cannot be justified (in relation to increased sales or other cost changes), employment is reduced in that department to restore the ratio.

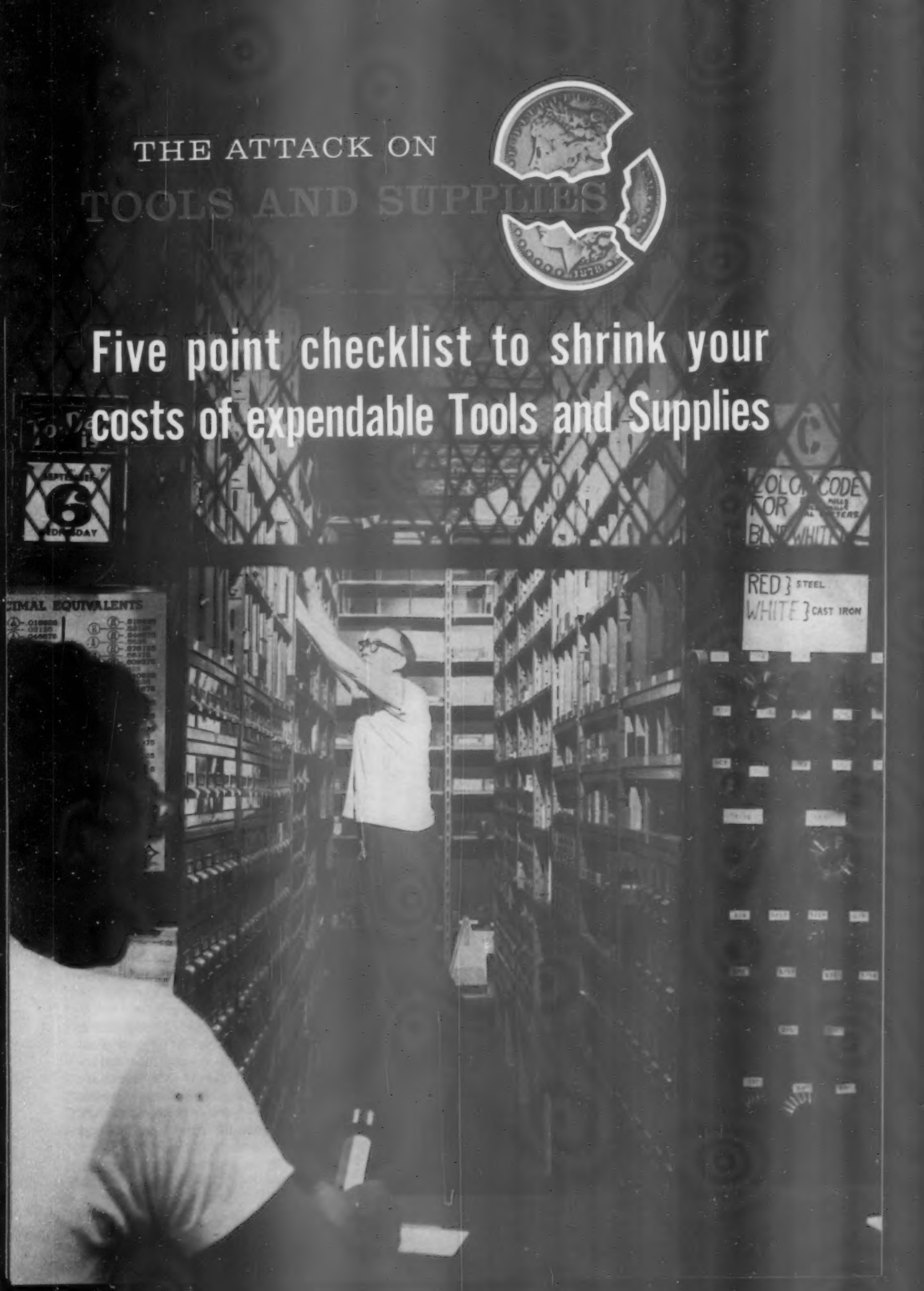
At General Electric Company, Pittsfield, Mass., and Cosden Petroleum Company, Big Spring, Tex., they're using existing telephone service to speed vital management information to staff men.

The process is simple: By dialing a prescribed number on any plant phone, the staffer gets a recorded information bulletin. Messages are changed as required by events. Emergency news breaks are announced by the plant operator just by ringing each extension.

THE ATTACK ON

TOOLS AND SUPPLIES

Five point checklist to shrink your costs of expendable Tools and Supplies



"Expendable tools and supplies" cover a myriad of items—often too many—that are consumed in the production process but do not become part of the end product. On page 142 there's a general list. They're scattered around the plant—in receiving, stores, production areas, and even in such dubious places as employees' lockers and homes. Are your costs too high? This checklist can tell you why.

ARE YOUR PURCHASING POLICIES EFFICIENT?

1. Are tools and supplies budgeted?
2. Does each cost center have a list of tools and supplies it uses?
3. Do you standardize your tool and supply buying whenever possible?
4. Are any cost centers charged with T & S they don't receive or don't use?
5. Are procurement orders approved by managers?
6 Do you purchase by specification rather than brand?
7. Do you rent special tools instead of buying?
8. Is it possible to buy jointly with other plants in your organization in order to lower prices?

WHAT DO YOU HAVE ON HAND?

1. Do you have obsolete tools, dies, jigs, or fixtures in your toolroom?
2. Are there uncalled-for supplies cluttering up your storeroom space?
3. Is inventory control of T & S adequate?
4. Do you re-order strictly on the basis of minimum and maximum standards or do you use economic order quantities for heavily used, inexpensive items?
5. Do spent T & S have any scrap value?
6. Do foremen have catalogs of standard T & S?
7. Is there adequate control of issuing?
8. Are T & S delivered efficiently?

DO YOU HAVE STORAGE PROBLEMS?

1. Do you order in bulk and let your jobber be your inventory keeper?
2. If not, can purchase orders be made smaller without price penalties?
3. Are tools and supplies protectively stored?
4. Can some items be stored at point of use to save excess handling?
5. Are there too many people manning tool cribs?
6. Do attendants know their jobs?
7. Are cribs and storerooms conveniently located?
8. Do vendors ship tools and supplies in best packages for storing?
9. Are tools and supplies stored in areas known to all authorized persons or are they secretly cached?

HOW ARE YOUR TOOLS AND SUPPLIES MAINTAINED?

1. How many supplies are regularly discarded by stores due to disintegration?
2. Can any supplies be conditioned for re-use?
3. Are inflammable items stored safely?
4. Do crib attendants repair and condition tools?

DO YOU GET YOUR MONEY'S WORTH?

1. Does anyone periodically evaluate the effectiveness of an item?
2. Are new products better than some you're using?
3. Do employees know the value of expensive items?
4. Have you made sampling observations to cut waste?
5. Is pilferage a major problem?
6. Would it be more economical to buy some items ocally only when needed?
7. Can multi-purpose tools supplant special tools?
8. Will new production methods or equipment cut your expenditures for T & S?
9. Do paperwork costs sometimes exceed the cost of items recorded and reported?
10. Can you explain satisfactorily any increase in T & S costs over the past year or two?

Take the sting out of Tool and Supply costs

. . . and here are 13 fertile places you can start

Lubricants: Cut down on the number of types of oils you use. See if one oil can do more than a single job. Winchester Western, New Haven, Conn., reviewed its plant lube program with this result: It formerly purchased 54 varieties of oil, but found it needed only 19. Whenever possible, salvage oil by separating it from scrap metal.

Solvents: Insist on bulk deliveries at a centralized tank and then deliver to your production areas by means of a pipeline. It'll cut down on waste.

Pipe: Investigate the feasibility of using relatively inexpensive plastic type as a substitute for metal pipe.

Cutting Tools: Consider using disposable carbide tools instead of resharpening standard tool bits. It can save you money and improve quality at the same time.

Grinding Tools: Purchase multi-use tools. And use special accessories such as right-angle attachments to make your tools more versatile. It'll cut down on the number of tools you need.

Portable Tools: Make sure adequate controls are established to guard against pilferage, especially in the case of electrical tools that can be used in the home.

Wrenches: Avoid purchase of wrenches that can perform only one task. Use multi-use wrenches whenever possible, such as those with double-end and adjustable openings.

Gauges: Check them each time they're returned to the tool crib and send them to the calibration shop periodically to make sure they are still accurate.

Work Gloves: Put an end to petty pilfering by requiring all your employees to turn in used work clothes and gloves before receiving a fresh issue. Adopt this technique also in the case of broken hand tools.

Containers: Get purchased parts in containers that can be used for production handling.

Jigs and Fixtures: Consider the use of magnetic and electrostatically controlled chucks and work benches to minimize need for jigs and fixtures.

Grinding Wheels: Use ultrasonic cleaning to prevent loadup, thereby extending wheel life. If costs are still excessive, consider tumbling or shot blasting rather than grinding.

Wiping rags: Decide whether disposable paper towels could be more economical than cloth rags.

These rules can shave dollars off your costs . . .

1. Standardize your tools and supplies throughout the plant wherever possible. Thus you'll be able to purchase them in more economical bulk lots, and also have interchangeability of parts. Sperry Gyroscope Company, Great Neck, N.Y., encourages departments to use standard tools wherever feasible by charging only special tools to the department budgets. Standard tools come out of a general fund. There's no problem in locating standard tools. They're listed in a catalog which is in the hands of every department head.
2. Make sure department heads don't purchase their needs independently. Above all, make sure they check the tool and supply rooms before making out purchasing requisitions. Have a definite chain of command for the purchasing function.
3. Train your tool crib attendants to be alert to abnormal consumption of tools and supplies. They should be your first line of defense against waste. Too often attendants are human adding machines—slaves to minimum and maximum inventory figures.
4. Consider having your craftsmen supply their own standard tools and, if necessary, issue them a set cash allowance for this purpose. It's surprising how much more care they'll exercise.
5. Make requisitions for the purchase of special tools subject to the approval of the engineering department. If feasible, have expert engineers in certain fields—say abrasives—on call to check requisitions in their specific line.
6. When making purchases, compile a list of reliable vendors in a specific field. Then buy specifications rather than brands. This can add up to big savings with no loss of quality.
7. Keep a close check on your "Rube Goldberg" foremen and standardize production methods throughout the plant wherever possible. Then find out what's the best tool for the operation. You'll cut down considerably on the number of tools required by this system.
8. Have contractors in your plant use their own tools. It'll cut down on wear. And tools lent to outsiders are tough to keep track of—they often disappear.
9. Consider renting rather than purchasing special tools when they're required for non-production line or for one-time operations.
10. Buy supplies in "economic order quantities" instead of following rigid minimum-maximum standards for inexpensive items—say under $5. If the size of your plant warrants, EOQ can be determined swiftly by electronic data processing.
11. If space is a problem in your plant, let your jobber be the inventory keeper. This can be done by placing bulk lot orders annually and stipulating when deliveries are needed. You can always cancel the unneeded part of the order. You may have to pay slightly higher prices for some items due to lack of bidding to obtain this service, so keep close tabs on your inventory costs to determine the economic feasibility of annual orders.
12. Periodically check your storerooms and tool cribs to make sure obsolete and slow-moving items aren't wasting valuable storage space.
13. Make arrangements for the exchange of surplus tool and supply inventory among the various plants and departments of your company.

. . . but watch out for these pitfalls

1. Poorly kept records can make a mish-mash out of your entire tool and supply system.
2. Lack of communications between your purchasing and production people means waste in the form of duplication and uneconomical small lot purchases.
3. Overspecialization of tools and supplies means large expenditures.
4. Don't drown in a sea of paperwork. Make sure the cost of keeping records doesn't exceed the worth of the item that you're keeping track of.

Here's how six plants slashed costs

Whirling oil free

Cutting oil doesn't end up in the scrap heap with metal cuttings at Winchester Western Division, New Haven, Conn. A centrifuge machine separates oil from scrap and it's reused. What's more, the company receives more money for its scrap metal with the oil removed.

Pegboard control of requisitioned tools

A quick glance tells this tool crib attendant which workers have tools checked out. At Union Carbide Metal Company's Marietta, Ohio, plant, there's no need to check through an ocean of requisition slips. The pegboard does the trick.

Each worker authorized to check out tools has a numbered slot. When he needs a small expendable tool, he writes out a slip which is then placed in his slot. Larger, more expensive tools taken are represented by tags hung from the slot. A list hung on the side of the board contains the workers' numbers.

Brainstorming T & S costs down

A small tools committee that meets monthly is the key to reduced tool costs at Sperry Gyroscope Company, Great Neck, N. Y. Composed of representatives of various production departments, the committee brainstorms means of bringing down tool costs. This includes examining new products for possible purchase, rechecking tools presently in use for obsolescence and studying possible revision of uneconomical production methods. To guard against the committee being drained of ideas, an entire new group is appointed every six months.

In the photo the committee is studying soldering irons. Result of this session: One iron costing $2.22 was replaced by a $5.35 model for economy. (That's no misprint!) Annual maintenance costs (workers' time and replacement of parts) on each old iron added up to $189.22. The more expensive tool costs only $9.51 a year to maintain.

Large tools move via conveyer...

A double-track roller conveyor solves the problem of transporting heavy tools and fixtures to work areas at Rohr Aircraft Corporation, Chula Vista, Calif.

The conveyor winds through the production area and has several transfer junctions, so the tool can be moved to the exact position needed. The system even extends outside the building. For convenience, metal storage tool racks are located close to the conveyor.

Fixtures are placed on the conveyor on a hoist and travel through the parts kit area where proper components are attached.

The second track is used for emergency operations when fixtures or tools are needed in a hurry. Tools and fixtures weighing from 2 pounds to nearly 500 pounds are transported on the conveyor.

...small tools by wheeled carts

Power tools are on call anywhere they're needed at Rohr with this wheeled A-frame kit cabinet.

Resembling double-sided display cases on wheels, the carts are equipped with metal-lattice front doors. The power tools are secured on interior pegboards which are visible through the lattice.

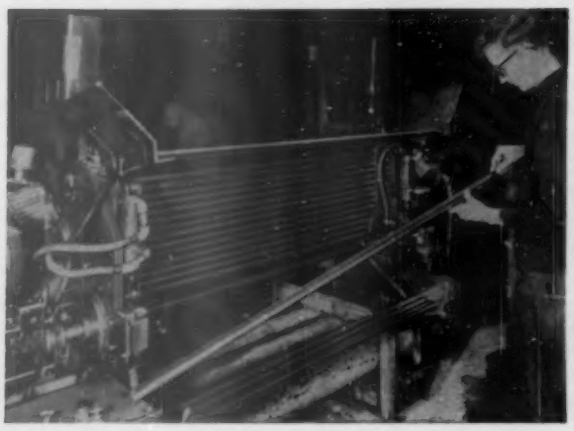
To prevent pilferage, the doors are locked and the key left in the possession of the group foreman. At the end of a shift all tools are returned to their proper places on the pegboard.

This cart performs the function of providing a handy point-of-use storage center for power tools. This means the elimination of long waits on line to return tools to the central crib. Once a week the mobile cabinets are inspected and discrepancies noted.

Longevity by hard-surfacing

Hard-surfacing a steel nozzle has extended its life expectancy from four to 32 hours at Stitt Machine Company, Vandergrift, Pa. The nozzles are used to spray vitreous china glaze. And the extremely abrasive slurry plays havoc with the steel.

The problem has been alleviated by hard-surfacing the steel with nickel base alloy (Wall Colmonoy Corporation, Detroit).



Cobalt bits cost more, but are cheaper

This is no contradiction, but a fact at State Industries, Inc., Los Angeles. The company is using cast cobalt-base alloy tool bits to deburr ends of welded steel tubing. Previously, the plant experimented with tungsten carbide bits which were one-half to one-third cheaper than cobalt models. However, they only produced 150 to 500 pieces per grind and the company reported poor results with resharpening. The cobalt bits (Haynes Stellite Company, Kokomo, Ind.) accounted for 2500 pieces per grind, and they could be successfully resharpened 35 to 50 times.

THE ATTACK ON UTILITIES

When you attack utility waste you can start almost anywhere and expand as early savings pay off. Here are the places and things to check first and the reasons why they are important. **For tips on organizing, see page 148.**

	CHECK THESE . . .	BECAUSE . . .	YOU'LL SAVE . . .
POWER	1. Does everyone know equipment operating costs?	You'll be amazed to find how few people really know how much it costs per minute to run a 50-hp. motor, or a bank of lights, or an exhaust system.	Generalities don't have half the effect of a statement (next to the switch) like "Every extra minute a shift this switch is on costs $128 a year."
	2. Have you investigated getting more favorable power rates?	It is not a utility's responsibility to see that you are given the most favorable rate, although many of them try to do so.	Ask the utility company to figure bills under alternate rates whenever usage pattern, kva. demand, or kwhr. total changes. Shift peak loads to low periods.
	3. Are you certain that plant loads are not over-motored?	Running motors under partial load lowers power factor (by as much as 20%), increases power waste by several per cent. Clip-on instruments (rentable) tell you how well loaded any motor is.	Surveys in plants invariably turn up oversize motors. Switch underloaded motors to bigger loads. Insist that all new motor requests be checked.
	4. Are sensitive loads getting the proper voltage?	Incandescent lamps last 50% as long at 105% voltage. At 95% voltage, they give only 86% as much light. Almost all electronic and electric equipment is damaged or wastes power (or both) when voltage is wrong.	Off-normal voltage invariably increases maintenance and power cost. Correct it by adjusting transformer taps or shifting loads. If voltage swings are excessive, voltage regulators are needed.
HEATING—COOLING	1. How much of your boiler plant could be put on automatic operation?	Modern automatic controls can take over every essential boiler and auxiliary supervisory function. Suveillance over operation can be handled by guards or maintenance crew on night (or all three) shifts. Most state laws are no problem.	Adapting boilers and auxiliaries for automatic operation saved more than just labor dollars. In the process you are forced to get rid of questionable operating practices, divided responsibilites, and obsolete or unsafe equipment.
	2. Do you keep a continuous check on all important heating system costs?	Waste is easy when no one keeps track of costs per pound of steam produced, pounds of steam lost, changes in stack temperature, or stack gas content. Off-optimum operation (caught immediately) is no problem. Maintenance may be needed, water treatment may be off, or operators may be slacking off.	Any serious departure from normal boiler efficiency means fuel dollars wasted (a 10% increase in the average cost of steam can creep in without warning). Daily or shift readings of fuel usage, steam production, make-up water usage, can be obtained from simple meters (economy installation under $1000).
	3. Have you looked at all the possible ways to reduce space heating costs?	New methods and low-priced equipment are available (gas or electric infra-red spot heaters, direct-fired area heaters) for low occupancy or open areas. Where system takes too long to heat up in mornings, shift more heat to plant periphery.	Heating people instead of space frequently cuts costs in half. Employees like it. Heat is on only when needed, and sources can be moved easily. Big plants may save with central control and monitoring of area temperatures.
	4. Can you cut out any of your process heat?	New cold-water chemical cleaners may outperform steam. Increasing turbulence of air may cut heat (or cooling) needs in dryers, furnaces, water baths, etc.	Cutting process heat cuts steam demand and line losses, improves summer comfort.
	5. Have you proper amount of insulation on pipes, ducts, ceilings, and walls?	Insulation economics has changed markedly in recent years. New insulations (prefabricated, easy to mold, or blow-on) are cheaper, easier to apply, and withstand conditions that ruined older types.	There's a break-even point for insulating every heated (or cooled) surface. It varies as the costs of money, steam, and insulation change. Use a good manual on insulation economics (see page 149).
	6. Have you checked every important heat-using and heat-losing point for recovery possibilities?	Heat exchangers of all types are feasible today—for smaller jobs, more corrosive fluids, smaller temperature differences. Same applies to the pumps and blowers that handle the fluids. Assemble-your-own and modular-type units are increasingly available.	Every Btu. down the drain or cut the stack has to be paid for. Heat recovery payoff studies are usually easy. Salvage heat from compressors, inter-coolers, furnaces, driers. Boiler feedwater, plating, driers, preheaters, space heating, can use this heat.

	CHECK THESE . . .	BECAUSE . . .	YOU'LL SAVE . . .
LIGHTING	1. Does everyone responsible know when it pays (and doesn't pay) to turn off the lights?	Every time a fluorescent (or MV) lamp is turned off, life is reduced. Power consumption is too. Lamps difficult to replace shouldn't be turned off for short intervals. Suppliers can show you how to figure minimum turn-off time (also see "Let 'em Burn—or Turn 'em Off" FACTORY, Oct. 1958, p. 94).	Adequate, pleasant-to-work-in lighting is not a luxury. But any level of lighting when nobody needs it is just plain waste. Set up a turn-off routine with clearly marked switches. Other pointers: Turn off lights where daylight is adequate. Have enough switches. Switch outdoor lights automatically.
	2. Would relighting with modern equipment pay off in any plant areas?	With new lighting equipment, you can frequently convert old systems without expensive alterations—end up cutting annual lamp and cleaning costs with double the light for a few more kwhrs.	Modern lighting may enable one fixture to give more comfortable light—at less cost—than three old ones. Many relighting jobs pay off in less than a year. Incandescents are seldom justifiable today.
COMPRESSED AIR	1. Do you check air system leakage regularly?	Leaks cut tool efficiency, waste power, cut line pressure, require excess compressor capacity. Use maintenance or guard staff to listen for leaks.	Any leak you can hear costs at least $50 a year. A ⅛-in. hole uses 4 hp. At 80 psi. (check right at the tool) production of tool is down at least 20%.
	2. Are you wasting air through inefficient practices?	Here are some places you can save. Use high instead of low pressure air to cool, dry, eject, or clean parts, or to operate air cylinders. Use solenoid air valves to shut machine air with power.	Air costs more than you'd guess (check it, some time). Campaigns and surveys to cut air invariably pay off. But include the entire air system.
WATER	1. Have you checked all obvious water-wasting practices?	Check these: Use spring-loaded valves. Block off excess flow everywhere—from cooling coils to wash fountains. Keep float valves adjusted. Use thermostat-controlled traps or solenoids for cooling circuits; increased turbulence or reverse cascade for rinsing.	The long-range picture for water for industry is universally poor. Rates are bound to increase. Don't wait until it's too expensive to learn how to trim water waste. Departmental water-metering is cheap—shows up trouble spots immediately.
	2. How many places could you re-use water?	Automatic monitoring and proportioning equipment, easier-to-maintain pumps, corrosion-resistant tanks and fittings make re-use of polluted water feasible today. Machine cooling, boiler feedwater, rinse tanks, and sanitary systems can use water second time.	With proper controls, recycling process water (even from plating or rinsing) offers great savings. Less water usage means less dependence on a utility frequently subject to political pressures. And probably better community relations, too.
WASTE DISPOSAL	1. Are sewerage charges correct and fair?	Improperly written or unfair rates based on water usage rather than actual disposal may mean a continual penalty. Try to get rate structure corrected.	If rates allow deduction for water not dumped, meter the water going into product, cooling ponds, towers, etc., for rebate (may be retroactive, too).
	2. Are you treating waste uneconomically?	Check these: Automatic monitoring with retention tanks. Portable tanks for occasional or remote treatment. Thorough mixing. Can you re-use treated water?	Letting effluent become a political target can cost you far more than proper treatment equipment. Right methods use less labor, chemicals, and water.
COMMUNICATION	1. Are your communication methods economical, matched to individual needs?	Dozens of well-engineered communicating systems are available to replace or supplement the desk phone. Two-way pocket and portable radio, pocket paging, dial-in paging, speaker and conference phones, ultra-flexible private phone systems, crane phones, ITV, and voice data-handling systems.	Every minute that a man (or the equipment he controls) is unavailable solely because of slow communication is an irrecoverable loss. Doubt it? Make communication systems pay off as you use them by leasing. To keep on top of field, make periodic surveys of employee needs and new equipment.
AIR HANDLING	1. Are you losing heat (or cooling) from excess exhaust?	Here are some ways to cut exhaust losses: Scrub and return air from grinding, buffing, plating. Run booth exhausts only when needed. Look for "short circuits" between air heaters and exhaust ducts. Base maintenance procedures on experience.	Each cfm. of heated air out the stack has to be paid for. Redesign of ventilating equipment is often inexpensve compared to Btu. savings. When buying new air-handling systems, specify carefully, and test before acceptance.
	2. Are ventilating systems properly designed, maintained, operated?	Surveys invariably show up exhaust hoods too far from work, bigger than needed, or made from hard-to-maintain materials. Eliminate or catch hood and duct condensation. Air jets surrounding fume source will direct fumes to hood, reduce cfm. needs.	Total horsepower used in ventilating drives is high, yet systems are studiously neglected. Unless maintenance is accessible, clearly specified, and checked on, clogged ducts, loose belts, off-balance fans thwart attempts to trim ventilation costs.

Utility costs? A 10% cut is easy

Half the battle in reducing utility costs is in starting out right. The *worst* way to start is to give the impression that you are on a penny-pinching campaign.

Most of us have had too many unpleasant experiences with penny-pinchers. Maybe it was a tight-fisted neighbor who let the furnace go out at night while his kids shivered in bed. Perhaps it was working under a foreman who stormed around closing windows, turning off lights, doing his correspondence on the backs of used work order forms. Meanwhile, obsolete ideas and bad employee relations were costing his department more in a day than he made in a year of string-saving. Whatever our experience, the vast majority of Americans have an antipathy toward frugality, especially when it holds us up to ridicule.

You have to frame any plans for cost cutting against this background, and particularly in the area of utility conservation. Many a worker who knows he can't afford to waste hot water at home apparently gets a feeling of affluence by letting a 125-psi. steam hose run while he lights up a cigarette.

How to cut waste in the face of this? No campaign to save power or heat or water can risk looking ridiculous. Everyone ought to be convinced that management is after smart saving, and is willing to spend money where the payoff time is unquestionably short. And the wider the participation, the better.

How much can you save? Depends on many factors of course. But 10% over-all is normally an easy goal. Double that if you are willing to invest modestly in new equipment. How long has it been since you went all-out to cut your utility costs? How carefully were your equipment installations engineered? Is yours a single function or small plant where off-normal performance demands immediate attention? Or is it a multi-products operation with divided responsibilities?

At the risk of oversimplification, you can divide utility cost reduction into three steps.

1. Cut obvious and deliberate waste of heat, light, water, etc. (immediate payoff).
2. Modify equipment or operating methods to cut waste (short payoff time).
3. Redesign or replace equipment to gain maximum system economies (longer payoff time).

Each step will pay, but there's a practical limit to the time or effort you can afford on each. The really big returns come in steps 2 and 3.

Why should a reasonably well-run plant be full of opportunities to save on utility costs? Because operating practices change—usually runing downhill toward carelessness. Relative costs of utilities shift (most plants are paying substantially more for fuel, water, sewerage, than they did 10 years ago). New developments keep changing the economics or practicality of methods. Most equipment is installed when business is good, everyone is busy, and nobody has time to think about optimizing utility usage.

CARDS ARE STACKED AGAINST ECONOMY

A disappointing number of plants operate with built-in assurance that they won't get utility economy. They muddle along under a set of rules in which the cards are stacked against the supervisor pleading that utilities get a reasonable proportion of the kind of scrutiny given to labor, material, and other operating costs. How many of these "rules" exist in your plant:

- Use a double standard when evaluating utilities. Think of their cost as an irreducible part of fixed overhead—unpleasant but necessary. But think of utility services as free, since the capacity for compressed air, steam, power, water is there anyway.
- Don't meter or even check power, water, steam, compressed air or gas usage by individual departments. Allocate costs on irrelevant bases like floor space, number of workers, product sale volume, or on an ill-conceived apportionment made a decade ago. Thus nobody will be blamed when utility costs keep rising.
- Put negotiations with the power, gas, phone, and other utility companies completely in the hands of the financial, legal, or purchasing people. Keep engineering staffs out of it.
- Buy new equipment on the basis of low first cost only. Don't consider efficiency or economy when evaluating which brand or type to purchase.

How do things get this way? Because management has seldom faced up to the problem of clearly defining authority and responsibility for acquisition and conservation of utilities, or evaluating utility economy. For instance, in many plants the plant or facilities engineer (or perhaps the power house superintendent) has no authority to end practices that he knows are hurting company profits. He may have good evidence that monthly power demand penalty charges originate in one specific department. Yet he can't insist that practices be changed or that the department be charged for the penalty.

What then is the best way to mount an attack on utility costs? Most successful campaigns fall into one of these four methods:

1. Set a modest, realistic goal for reduction of utility

costs, and rely on plant personnel at all levels to voluntarily participate in the drive.

2. Appoint a utility "czar" (either permanent or temporary) with the responsibility of finding where heat, light, power, air, etc., are being wasted. His recommendations may call for changed operating practices, purchase of new equipment, better maintenance.

3. Set up a utility control committee staffed by plant and industrial engineers, maintenance and production supervision, plus others who have the background to help the committee succeed. The committee sets up goals, tackling the problems sometimes utility by utility, sometimes department by department. Committee recommendations, when approved, become binding.

4. Engage a consultant to survey plant equipment, operating and maintenance practices, utility service costs, employee attitudes and suggestions. The consultant submits specific recommendations together with expected savings.

All four methods have been successful. The nature of the plant, the people available, how they work together, the problem of getting cooperation and money when changes are needed—all these determine which method is best for a specific plant.

WHEN TO CALL A CONSULTANT

Some of the best advice on what you should do before deciding to call a consultant comes from G. S. Bataille, a Chicago consultant in utility waste recovery.

"Few companies realize the potential in utility waste recovery. First step must be to demonstrate this potential to themselves, by making some important savings through their own efforts. Some companies . . . will then decide they are equipped to do the whole job themselves.

"But most companies, after they accomplish as much as possible with their present personnel, will be interested in an all-out, plant-wide program with specialized personnel and equipment.

"If they then turn to a consultant, they will have already skimmed the cream—they will have done the easier and less complicated jobs. But what are consultants for if not to tackle jobs that are too specialized and time-consuming for regular personnel?"

FREE HELP FOR THE ASKING

Your staff may get a surprising amount of help free, too. If there's evidence that cost reduction studies will show need for new equipment, don't turn down the help you can get from vendors. Air compressor manufacturers will help you run air systems studies. Switchgear manufacturers will furnish you with do-it-yourself kits that enable you to survey your entire power distribution system. Instrument manufacturers will loan or lease instruments enabling you to see where permanently installed meters would help you control waste. Telephone and two-way radio communication system makers will handle time-consuming employee surveys to find out who needs phones or personal communicating equipment and what type will be most effective. Lighting equipment manufacturers will practically lay out a complete relighting job so detailed that you can get contractors' bids on the drawings. In fact, there are few fields where you can't get some form of engineering help from your suppliers.

Some of the best help comes from industry associations. For instance, one book that should be available in every plant is "Manual on Economic Thickness of Insulation for Flat Surfaces and Pipes." This new handbook makes it easy for anyone to determine the optimum economic thickness of insulation for any temperature difference or type of insulation, with steam costs from $2 to $18 per pound per hour. The book is available ($10) from National Insulation Manufacturers Association, 441 Lexington Ave., New York 17, N. Y. By early 1962 NIMA expects to have another computer-prepared manual available, this one on insulating colder-than-ambient piping and ducts.

Application engineers whom FACTORY interviewed express baffiement at company utility equipment purchase policies. "I know, and the plant engineer knows, that power factor capacitors would be paid for in power bill savings in 11 months; but I can't get them off dead center on the proposition," is a typical comment. "If I owned a stock of capacitors, paid for the installation myself, and leased them to customers in my area for just what they saved each month, I could be a millionaire. Half the plants I go to figure I'm just another peddler, trying to sell them some fancy equipment they don't need. But I've done a lot of free engineering for plants that gave me a chance. Sometimes the ideas I've suggested have been brand new. With business poor as it was last year, some of my customers would have been in the red if it hadn't been for the cheaper-to-operate and better equipment I pushed them into four or five years ago."

STILL MORE ARE WILLING TO HELP

Call on your utility companies for help. Power companies offer all kinds of free services—studies leading to methods of cutting power costs, loan of instruments for making power use surveys, specialized training for your plant electricians, even maintenance (checking relay settings, meter accuracy, etc.). Understandably, utilities assume that if you want the help you will ask for it, that it's not up to them to ask you. Insurance company engineers, if they know you are interested, can furnish lots of money-saving advice on steam, air, and electrical systems practices.

Gas and oil suppliers, too, offer many services aimed at economy in the use of their products for fuel—heating surveys, boiler inspections, leak detection, plus advice on optimum usage to get minimum rates.

For background reading on utility construction, practically nothing is available in industrial management books. But industrial magazines have published many helpful articles and case studies. Here is an abbreviated list of the most useful articles that have appeared in FACTORY in the last few years:

Compressed Air Systems, October 1960, p. 93; Wasted Utilities Drain Dollars, June 1960, p. 238; Facts About Water Costs, October 1958, p. 156; Saving Money on Power, September 1958, p. 206; Utility Waste Recovery, August 1957, p. 116; Utility Services Aid Cost Reduction, August 1957, p. 112.

Sound engineering battles waste

CONTINUING UTILITY COST ATTACK REPAYS STEADY DIVIDENDS

A good example of what a plant can accomplish by constant pressure on utility cost reduction is shown at Electric Storage Battery Company (Exide) in Philadelphia. The plant engineering staff has been engaged in a long-term project to modernize plant facilities and to use every opportunity to reduce costs while doing so.

One simple tool that Plant Engineer A. F. DeLong developed early in the study was a power cost calculator. This graph is comprised of a series of lines superimposed on a graph with kilowatt demand plotted against monthly power bills. The lines correspond to kwhrs. and to the number of hours per week that the peak demand is required. This makes it simple to determine the exact dollar-cost increment of any plant load according to the length of time required and based on whether or not the load coincides with existing peak demand periods.

Two heavy power users were three central air compressors and the motor generator sets. After a campaign to find and keep down air system losses (night sweepers report leaks), Exide found that one compressor could handle the load most of the time and that two units could actually be shut down much of the time instead of idling with compressor valves unloaded. Timers delay the starting of these compressors until base load compressor is loaded over 80% of the time. (Exide doesn't switch base load from one compressor to another—prefers to have one high maintenance unit rather than three that might conceivably need overhaul simultaneously.) The new control system paid off in a few months, saves almost 20 kw.

High maintenance costs and low power efficiency pointed up the need to replace the plant's m-g sets with a silicon rectifier. This new 1596-kw. 133-volt unit will have paid for itself in power and maintenance savings within two years.

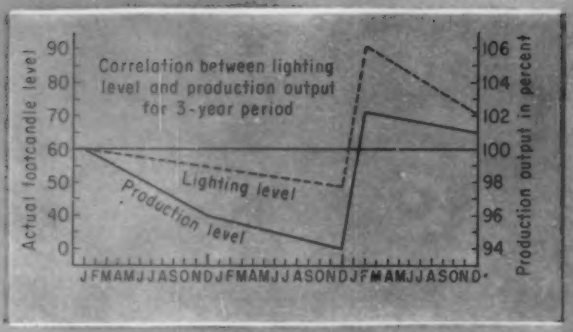
Sewerage costs were another target for Exide. Philadelphia sewerage rent is 50% of the water bill. based on the assumption that all water eventually reaches the sewer. Through conferences with city engineers using documented metering records, Exide was able to show that evaporated water (from leaching pond, spray tower, etc.), plus water going into the product (batteries) and water for auxiliary uses like boiler blowdown, etc., justified a reduction in sewerage rent. City authorities agreed —average annual saving is $1900.

One of the most impressive results of Exide's effort was the conversion of the plant's three boilers to automatic operation. This means an operator is now needed only during the day shift.

Boilers and auxiliaries were gone over carefully to get rid of any equipment shortcomings that had in the past been overcome by operator skill or patience. Then alarm panels were installed in the boiler house and in the plant-entrance guard house. Cutouts (plus alarms) were installed to shut down the boilers in case of extra high steam pressure, extra low boiler water, and low fuel oil pressure. Alarm warning lights indicate low and high steam pressure, low and high boiler-water levels, off-normal feedwater pressure and level, and burner failure. Upon noting an alarm during the night or weekends, guards immediately call designated plant engineering or maintenance personnel.

ELECTRIC DOORS SAVE HEAT AND TIME

Avon Sole Company (Avon, Mass.) moves some 3,000,000 pounds of materials in and out of the plant every month. Six doors carry the bulk of the traffic. A usage survey (Barber-Colman Company) showed that fast electric door closers would save a minimum of $215 annually in heat. This, plus employee comfort, made them well worthwhile, but labor savings for the 20 truck drivers turned out to be much more impressive—$5000 a year. Overhead ratchet-type pull switches enable Avon drivers to close or open the doors without leaving their normal travel path or slowing down.



PRODUCTION FOLLOWS LIGHTING LEVELS

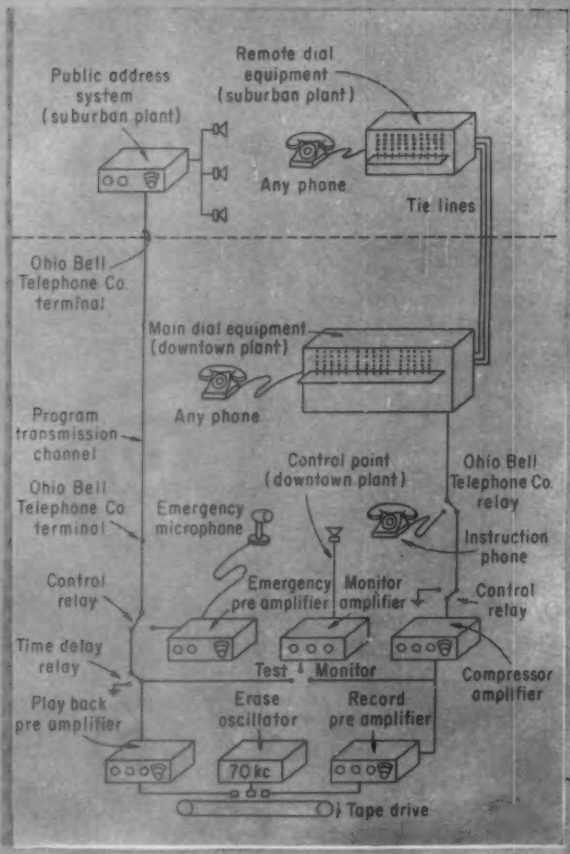
Frank Miller, plant engineer at Robertshaw-Fulton Controls Company (Long Beach, Calif.) took advantage of a rare opportunity to correlate production output and lighting level over a three-year span. The curve above is the result. "Normal" (60 ft.c.) lighting and production (100%) were set after the first full year of operation in the assembly area—where work pace is independent of other plant areas.

No fixture cleaning or relamping was done for two years. (The long lamp life is a result of round-the-clock operation—no turnoffs.) When complaints began, cleaning and relamping (with higher output lamps) immediately brought up production level. "With these data," points out Miller, "we can now determine the most economic point between high footcandle, high-upkeep level, and low footcandle, low production level."

CENTRAL CONTROL ENDS HEAT WASTE

No heat or refrigeration is wasted through out-of-line temperatures, when they are controlled and monitored from a central point. The operator can keep tab on temperature, heating and cooling systems performance, and impending trouble, all without leaving this control room at Hughes Aircraft Company's Culver City, Calif., plant. The installation cut system manpower from six men to one man part-time.

Plant has 7000 employees, 1.7-million square feet, 3300 tons of refrigeration cooling, and 380-deg. HTHW heating. Panel at left records temperatures of any six critical areas. Center panel reads out individual temperatures in any of the plant's 80 areas. Switches in upper halves of panels control fans. Lower halves are pilot lights. Intercom system microphones in fan rooms warn operators of faulty machinery.



TIME LAG PERMITS AUTOMATIC PAGING

How can you handle voice paging at a plant without the expense of round-the-clock phone operators or guards? That was the problem at the suburban plant of Delco Products Division of General Motors Corporation, Dayton, Ohio. Management felt the plant was too big for completely unsupervised telephone paging. The answer was the system shown at left, worked out by Donald C. Neubauer, senior electrical engineer at Delco.

When anyone at the downtown or suburban plant wants to page anyone at the suburban plant he dials a code number and states his message. As he does this, the belt-type tape recorder records the message which is simultaneously heard over a speaker in the downtown plant guard office. Ten seconds later, the tape plays back the message over the suburban plant PA system. If the guard wants to interrupt the message for any reason, he has 10 seconds during which he can pick up his telephone and talk to the caller. This automatically opens the control relay and stops the message.

To reduce starting duty, the tape drive operates three minutes after the message is completed. Amplifier plate voltage is off except during messages. Components are communication type, designed to operate unattended for 1000 hours. Ohio Bell Telephone Company furnished the control relay with auxiliary contacts, plus some advisory service. Delco did the engineering. The unique system made it possible to consolidate all plant protection services in the downtown plant and eliminated the need for four telephone operators. Delco reports the layout works well, paid for itself within a year.

Vernard D. Hanna, right, Controller of Wolverine Tube, Division of Calumet & Hecla, Inc., inspects a seamless copper tube with Walter B. Sinclair, Sales Manager of American Mutual's Detroit Office, at Wolverine's New Products Laboratory. Wolverine mills, manufacturing a variety of tubes in copper, aluminum and special metals, are located in Detroit; Decatur, Alabama; London, Canada.

"I like a man who knows our business"

"Walter Sinclair of American Mutual has taken the trouble to study our business thoroughly," says Vernard D. Hanna, Controller of Wolverine Tube, Detroit, Michigan. "As a result, over the past 5 years we've been able to improve our coverage while bringing our company's Workmen's Compensation insurance cost 34% below the industry average."

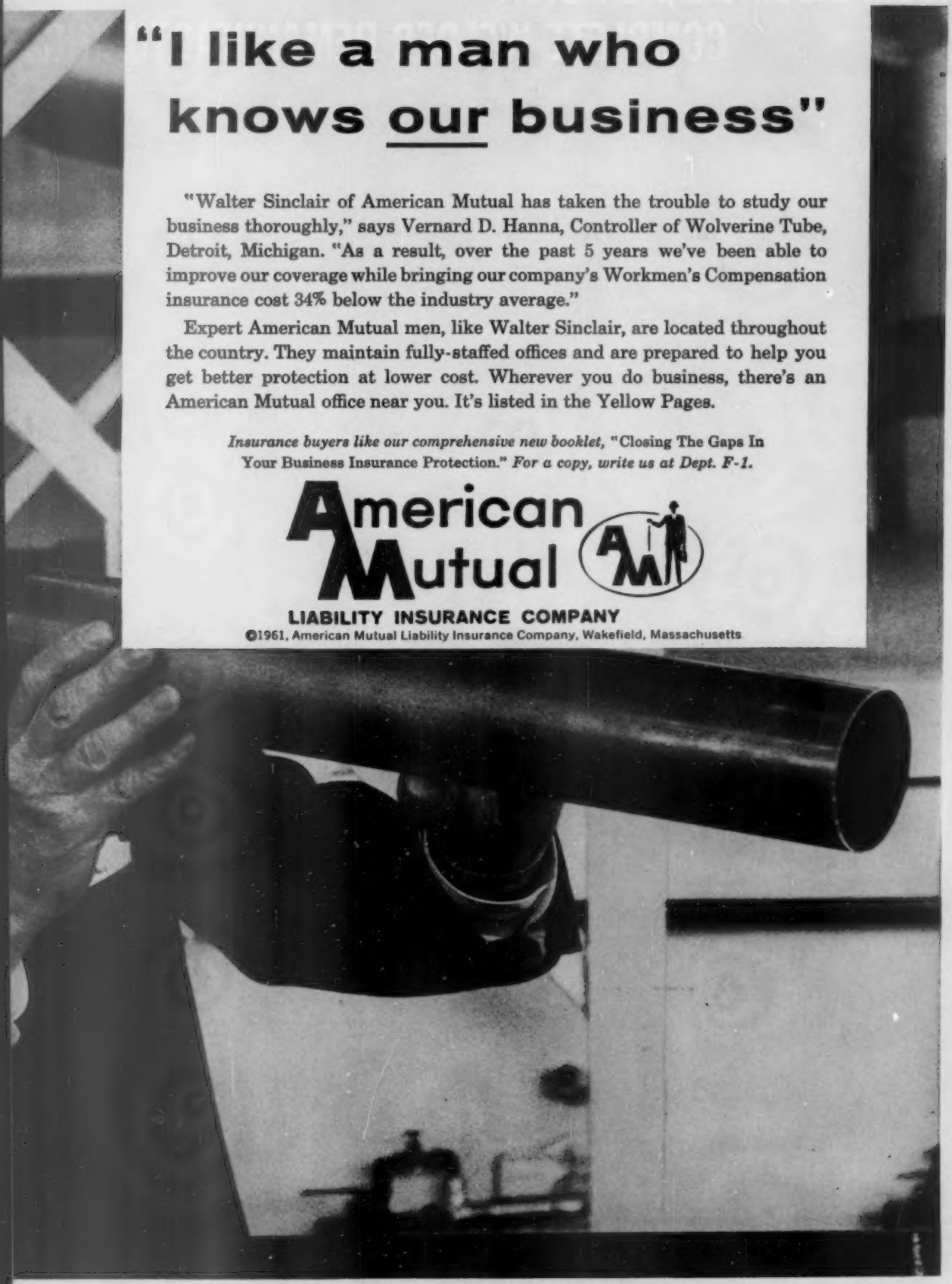
Expert American Mutual men, like Walter Sinclair, are located throughout the country. They maintain fully-staffed offices and are prepared to help you get better protection at lower cost. Wherever you do business, there's an American Mutual office near you. It's listed in the Yellow Pages.

Insurance buyers like our comprehensive new booklet, "Closing The Gaps In Your Business Insurance Protection." *For a copy, write us at Dept. F-1.*

American Mutual

LIABILITY INSURANCE COMPANY

©1961, American Mutual Liability Insurance Company, Wakefield, Massachusetts



Lincoln Electric's plan for . . .

COMPLETE WELDER REMANUFACTURING . .

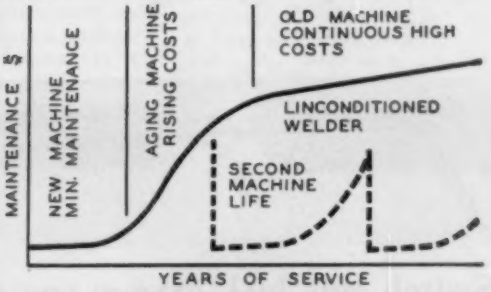
Machines returned to the plant for remanufacturing are completely torn down and rebuilt with new parts where needed. All work is done at published prices known beforehand. Owner receives new machine guarantee on completion of the work.

..REDUCES CAPITAL INVESTMENT, PRESERVES PROFITS

If you own Lincoln welding equipment, you know it traditionally outlasts other makes. Routine maintenance is all that's needed to keep it in top operating condition. But any machine reaches a point where mounting repair costs indicate the need for a complete overhaul. Lincoln provides a complete factory remanufacturing service for owners of Lincoln equipment. It's called Linconditioning. Because Linconditioned welders carry a new machine guarantee, effective life of your welder is extended 100% at about half the cost of a new machine. This kind of service, we believe, helps Lincoln customers battle indirect costs, preserve hard-to-keep profits.

Your welder is disassembled right in the Lincoln plant by trained factory mechanics; then completely overhauled and remanufactured. Parts are restored to like-new condition. Those beyond repair are replaced with the same new parts which go into brand-new machines. Here, frames from generator-type machines are vapor-degreased. Dirt and dust is removed from the coils which are then tested for grounds, shorts and electrical balance. Each must test out like new before assembly.

Gas and diesel engines for portable welders are thoroughly reconditioned, too. Blocks are cleaned, inspected for cracks, sizes and general condition. Cylinders are re-bored, honed to proper oversize and finish. Valves and crankshafts, checked for wear, are reground and buffed. New piston rings are precision-fitted to bore size. After re-assembly, engine is idle-run to wear in.



Here's a graphic expression of Linconditioning. When a machine is new, it requires little if any maintenance. As it ages, the occasional service it needs can be obtained from your local Lincoln field service shop. But eventually, th. frequency of repairs causes constant expense. At this point, Linconditioning restores your machine to new condition, doubles its effective service life . . . all at a price varying from 40-50% of the cost of a new machine. Find out more about this money-saving remanufacturing plan now. Contact your local Lincoln field engineer. Or, write for bulletin 9100.1.

THE LINCOLN ELECTRIC COMPANY • DEPT. 1861 • CLEVELAND 17, OHIO

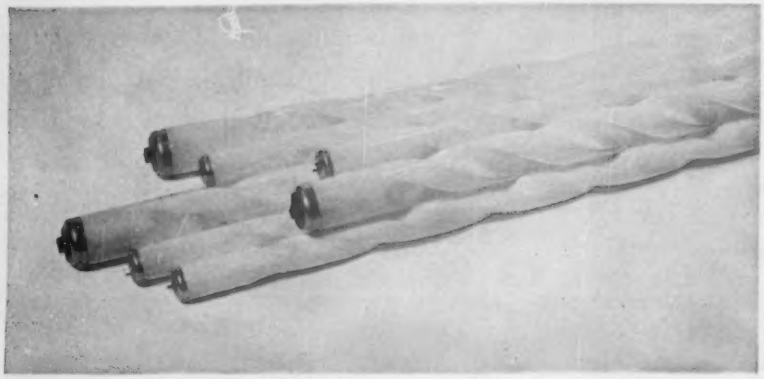
LINCOLN WELDERS

THE WORLD'S LARGEST MANUFACTURER OF ARC WELDING EQUIPMENT AND ELECTRODES

For more facts Circle 462 on Reader Service Card

EQUIPMENT NEWS

For more data, circle item numbers on Reader Service Card next to back cover.



20,000 brighter lamp hours

These figures apply to Power-Twist, a fluorescent lamp with a spiral shape. Design produces long arc stream, pear-shaped instead of round. As a result, the greater excitation of phosphor creates a 15% brighter light (80 lumens per watt) than other high-power output lamps.

The initial cost is greater than that of lamps now on the market but lamp life is substantially lengthened. Rated life of 20,000 hours is based on three-hour average "on" cycle; longer life is claimed for lamps burning constantly.

Lamp fits most standard-size fluorescent fixtures. In uncovered fixture, lamp design gives visual effect similar to "egg crate" louvers. Company claims a higher-than-rated light output with the installation of new ballasts and fixtures.

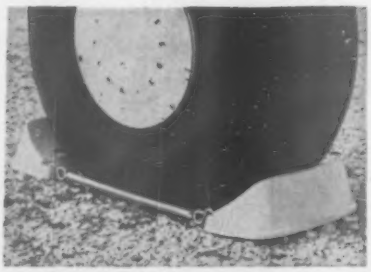
Comes in 40- to 215-watt, preheat, rapid start, slim and 1500-ma. types, 4- to 8-ft. lengths, all colors. *Duro-Test Corp.* (Circle 88)

Switch cuts fuel, oxygen consumption

Always ready to go with a flick of the switch, this automatic welding torch is just the thing for operations needing frequent re-lighting. In "off" position, flame is lowered to pilot size, thus using less fuel and oxygen. Back "on," the original pre-set, full flame is restored. Fuel, oxygen savings to 50%. *Harris Calorific Co.* (Circle 89)

90—Engineering machine, tape controlled, accurately prepares drawing of part or assembly up to 60x144 in. Part must lend itself to mathematical definition for programing of tape. Produces solid or broken lines on standard drawing materials. *Ekstrom, Carlson & Co.*

91—Taper pipe tap produces accurate thread in metals to assure pressure-tight joints for critical pipefitting installations. Threads most metals with minimal stop lines. Tool maintains uniform cutting action. And it is claimed to have long life. *Besley-Welles Corp.*



92—Lightweight aluminum chocks secure wheeled vehicles with tire sizes from 10x3 to 24x6 in. Contoured face and connecting spring provide firm grip that prevents dislodgment. Minimizes danger of leaving vehicle unattended in aisles or on incline. *Maran Mfg. Co.*

93—Pocket-size two-way radio, with 11 transistors and 4 diodes, has superhet receiver, two-stage transmitter for industrial duty. No license to operate. Battery-powered. Plug-in rechargeable pack optional. Automatic ignition and squelch control. $110. *E. J. Johnson Co.*

94—pH analyzer system maintains stability of 0.01 pH in 24 hours at −20 to +122 F. Comes with milliamp. or millivolt output for potentiometric or current-type recorder. Solid state, low-cost plug-in components and circuits cut maintenance. *Beckman Instruments, Inc.*

95—Steam generator uses six lights to indicate automatically cause of shutdown—ignition failure; or shortages of water, fuel, electricity, or combustion air. Delivers to 6000 lb. of steam/hr., high and low pressures. Isolates trouble, minimizes downtime. *Clayton Mfg. Co.*

Turn the page

4 WAYS MONEY LEAKS THROUGH YOUR ROOF...

Left to right: **TRAPPED WATER VAPOR** creates these delamination blisters, which eventually break, causing leaks. **RANDOM CRACKS** mean top coating is being pulled apart by internal shrinkage stresses, exposing underlying felts and leading to complete roof failure. **COLONIES OF PIN BLISTERS** are another result of trapped water vapor. **DIRECTIONAL CRACKS** come from shifts and settling of deck or building, exposing felt and destroying protection.

...AND HOW LION ROOF PERM STOPS IT

New Lion Nokorode Roof Perm eliminates the two major causes of roof failure — trapped moisture vapor and stress effects.

Roof Perm is the first cold-applied roof coating ever developed which efficiently "breathes" out trapped moisture vapor.

Roof Perm remains pliable for the life of your roof, expanding and contracting with the roof deck and building to avoid cracking.

For permanent roof protection, and far lower roof maintenance costs, repair, recoat, recover or reroof with Roof Perm.

LION

Protective Coatings, Section 13

LION OIL COMPANY

A Division of Monsanto Chemical Company
EL DORADO, ARKANSAS

Monsanto

Send for your free copy of Lion's new and authoritative 36-page manual, "Controlled Roofing Design and Maintenance," which includes typical specifications for complete roof construction.

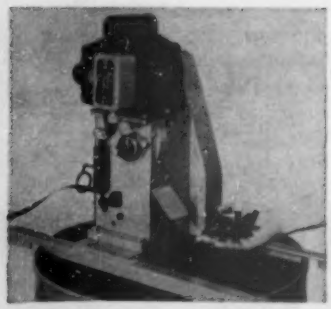
For more data, circle item numbers on Reader Service Card next to back cover.

Mobile mover of dry materials

A plant needs only one of these mobile pneumatic conveyor systems to transfer granules or powders from railroad cars to trucks, bins, or machines. Pneu-Pac's flexibility adapts to changes in storage or unloading conditions that would challenge permanent installations. This ability to get close to unloading site reduces horsepower needed.

Towed on wheels or lifted on skids by truck, system is gas or electric driven. Sucking action through flexible hose draws product into top of cone-shaped collector; blower pushes it through (up to 100 ft. of pipe) to discharge point. No loss of material; no exterior dust; a minimum of moving parts.

Highly efficient, easy to install. Two compact 8-ft. models: 25 hp. has 6- to 15-ton/hr. capacity; 40 hp., 10- to 20-ton/hr. *Sprout Waldron & Co.* (Circle 96)



97—Portable strap chopper cuts flat and oval steel strapping into 3-in. scraps at 70 fpm. Eliminates accident hazards of balled or folded scrap. Fits over 55-gal. drum, or on bin or salvage truck. *A. J. Gerrard & Co.*

Pilfer preventer—locked compartment in locker

Supervisors please note. Here's a clothes locker where you can store valuables along with the usual paraphernalia. A separate compartment with lock or spring catch in locker discourages pilfering.

Compartments within 24x21x66-in. unit includes two shelves for storage of books, hat, shaving equipment. Bottom section holds small suitcase, bowling ball, etc. And there's room to hang five coats. Comes with mirror, comb-and-brush holder, and towel bar.

Two heavy-duty steel doors can be locked with key, combination or padlock. Louvers ventilate interior. Choice of three colors. *Alan Wood Steel Co.* (Circle 98)

99—Area lighting series includes mercury, Quartzline, and post-mounted units. Mercury units throw wide-angle beam. Quartzline lamps light large areas with few fixtures. Post fixtures are designed for mounting low; includes one for fluorescent lamp. *General Electric Co.*

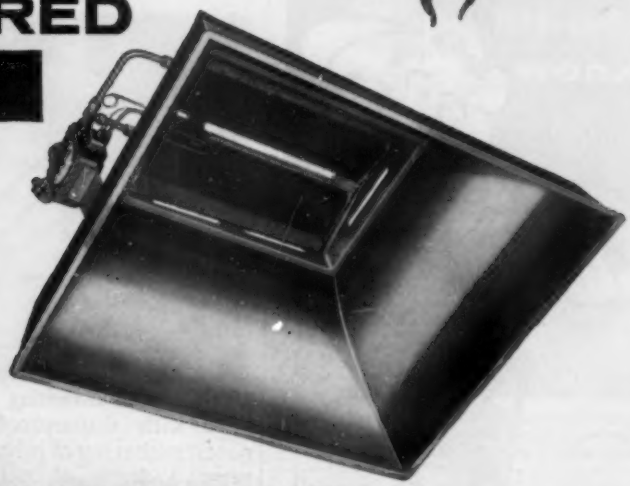
100—Dock leveler automatically adjusts to truck height. Leading edge moves to 15 in. above or 8 in. below dock floor. When not in use, lies flush. Low cost, easy to install. Sealed, lubricated bearings. Little maintenance. *Magnesium Co. of America.*

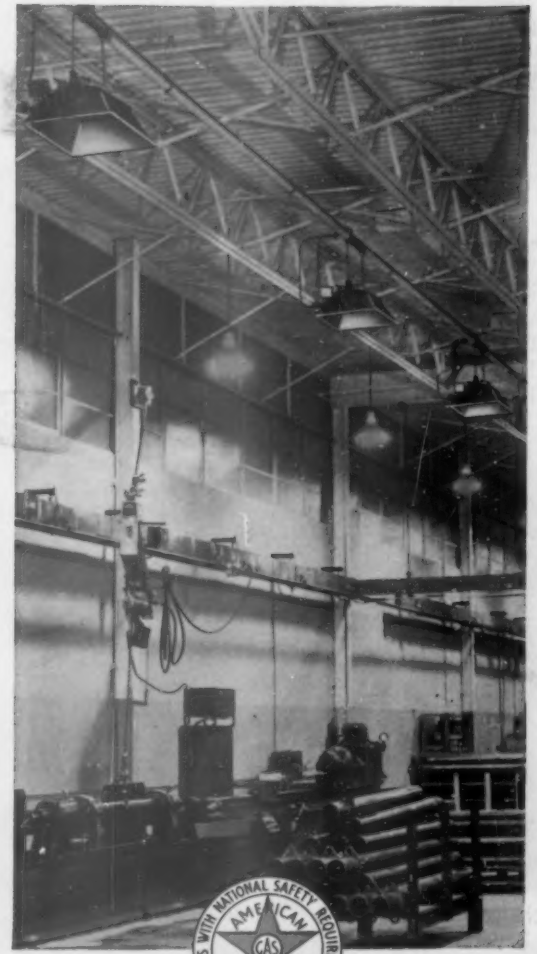
101—Silicon rectifier provides automatic control of 1000 to 10,000 amp., 6- to 100-v. output. Current limiter prevents overload under normal or short circuit conditions; rectifiers can be paralleled with no additional controls. *Hanson-Van Winkle-Manning Co.*

102—Metertrol is remote positioning control combining pushbutton station with position-indicating meter. Controls actuators, reversing motor starters, 4-way directional control valves. For direct, chain, gear, or belt connection. 110 v. a-c. *Jordan Controls, Inc.*

Turn the page

Save with VAN DORN GAS FIRED INFRA-RED AREA HEATERS





ALL METAL CONSTRUCTION

Van Dorn Infra-Red Gas Fired Heaters and Generators are unique in that they utilize a high nickel alloy grid, Inconel metal. The burner plenum is made of grey cast iron while the grid frame is of high quality stainless steel. Special high temperature gaskets give assurance of long life, trouble-free operation. Since there are no moving parts, maintenance costs are kept to a minimum. Substantial savings in fuel costs have been reported from Van Dorn installations throughout the country due to the high Infra-Red radiation efficiency of the Van Dorn Generator design. All Heaters have A.G.A. Approval and carry U.L. Listing.

COMPUTE YOUR FULL B.T.U. REQUIREMENTS BY MEANS OF THIS VAN DORN HEATING CALCULATION METHOD

Compute square footage of exterior walls. Deduct from this figure total square footage of doors and windows arriving at net wall area. Compute square footage of roof. Compute square footage of floor. Compute cube of building to use as multiplier for Infiltration and Air change figures . . . Use the proper "U" factors and temperature maximum with above to determine total BTU heat loss. Consult engineering handbook for "U" factors.

EXAMPLE: A building 100′ x 200′ x 15′ at eaves and 25′ at center peak. 12" conc. block, conc. floor, metal roof 2" insul., one air change and 0 to 65° F. temp. range.

Walls 200 x 15 x 2 plus 100 x 20 x 2 = 10,000 sq. ft.	
Windows and doors = 1507—Net wall area 8493 x .33 x 65 . .	182,174
Windows 960 x 1.1 x 65	68,640
Doors 547 x .51 x 65	18,133
Roof 52 x 200 x 2 = 20,800 x .13 x 65	175,760
Floor 100 x 200 = 20,000 x .17 x 15 (Max. Temp. less 50) . . .	51,000
***Infiltration** 100 x 200 x 20 = 400,000 x .002 x 65	52,000
Air change 400,000 x .018 x 65	468,000
Total heat loss	1,015,707 BTU

*Note: The figure 20 used in cube of bldg. is avg. ht.

Take 80% of above total or 812,565 and divide by 20,000. This will tell you the number of Van Dorn Single Generator units needed, or 41 in this case. If Double Generator units are to be used, divide by 40,000 and 20 will be required.

AMERICAN GAS ASSOCIATION · APPROVED · COMPLIES WITH NATIONAL SAFETY REQUIREMENTS

Write for Illustrated Brochure

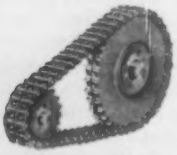
Screen and Plenum—Patents Pending
Coating—Licensee under Schwank Pat. No. 2,870,330

THE VAN DORN IRON WORKS CO. *INFRA-RED DIVISION*

2685 East 79th Street • Cleveland 4, Ohio

DODGE PRODUCTS you should know

NEW! DYNA-V DRIVES
Save space, weight and cost!



TAPER-LOCK ROLLER CHAIN DRIVES
No reboring — no waiting!

DODGE PILLOW BLOCKS with TIMKEN BEARINGS
America's Quality Pillow Blocks!

Write for Bulletins!

- ✓ Dyna-V Drives—selection data.
- ✓ Chain and Sprockets—drive data.
- ✓ Rolling Bearings—ratings, data.

DODGE MANUFACTURING CORPORATION
400 Union Street • Mishawaka, Indiana

DODGE
of Mishawaka, Ind.

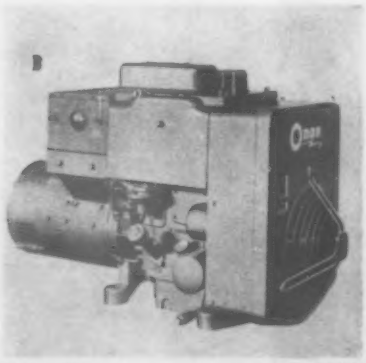
Begins on page 156

EQUIPMENT NEWS

For more data, circle item numbers on Reader Service Card next to back cover.

103—Explosion-venting window, fitted with shatterproof polyester panes, pushes out of rubber frame to permit release of gas build-up. Channels explosive force outward to minimize building damage. Panes automatically reset to seal out air. Various colors. *Kemlite Corp.*

104—Double line private phone, for in-plant phone system, has two extensions and an automatic "hold" feature. When line button is pressed, hold button automatically goes down. One line signals with buzzes, other rings. Cut-in button breaks in on busy line. *Tele-Norm Corp.*



105—Emergency generator, 5000 watts, is one of series of gasoline and diesel units using interchangeable parts between models. Parts for servicing and maintenance are easy to reach from one side of engine. Manual or remote starting, 120 to 240 v., 60 cycle. *Onan Div.*

106—Portable saw is driven by ¾-hp. gas engine for out-of-the-way places where no electricity is available. Uses pint of fuel per hour. Lightweight engine operates in any position—sideways or upside down. Has 8-in. blade for 45- and 90-degree cuts. *Siegler Corp.*

107—Hinged steel belting for conveyors can be installed above or flush with floor. Handles bulky, hot or heavy materials and assemblies. Reversible—transports load in either direction. Bends around convex or concave surfaces. In 12 to 60 in. widths. *May-Fran Mfg. Co.*

108—Instructor panel eliminates error in soldering wires to plug adapter. Operator selects instructor chart for proper plug and sets both in machine. As wire is soldered to right plug, number corresponding to wire lights on chart. *Winslow Product Engineering Corp.*

Turn the page

Simple, isn't it?

— and the time it saves!

Save an hour, two hours, three hours per change, and *you* figure what Taper-Lock mounting is worth to you!

Here is the simplest, surest method of mounting wheels on shafts. So superior that 160 manufacturers of mechanical power transmission parts use this mounting in their products—under license from Dodge. No other mounting system is so universal. Taper-Lock holds as though it were a shrunk-on fit. Yet by the simple use of its jack screws it "unlocks" like magic. No damage to shaft or machinery—no grunt nor groan nor wasted time.

Taper-Lock mounting is one of the plus features of Dodge sheaves, sprockets, couplings, conveyor pulleys. Ask your Dodge Distributor, or write us for bulletin.

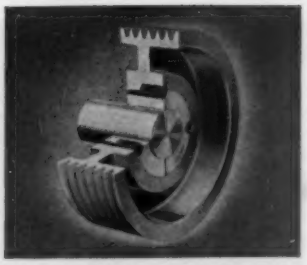
Dodge Manufacturing Corporation, 400 Union Street, Mishawaka, Indiana

The Products with the Pluses...

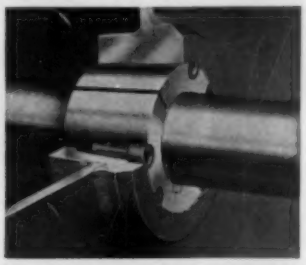
DODGE

of Mishawaka, Ind.

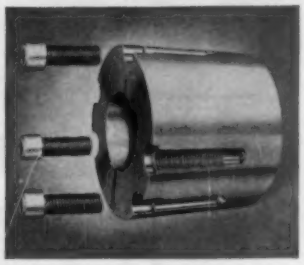
CALL THE TRANSMISSIONEER, your local Dodge Distributor. Factory trained by Dodge he can give you valuable assistance on new cost-saving methods.



No flange, no collar, no protruding part! Modern, safe, *flush* design. Minimum space on shaft. Mounts as a unit — tighten while sighting. Easy on — easy off!



Bearing surface runs the entire length of the hub and bushing. Full compression means extreme holding power. No wobble. Taper-Lock runs true!



Interchangeable bushings. Change from shaft to shaft, from one size to another, from sheaves, to sprockets, to couplings, to pulleys. Talk about inventory economy!

if BETTER plant housekeeping is your CONCERN

You can get this key engineering service - *FREE!*

With P-E-M

you get —

— A complete survey of your housekeeping requirements.

•

— A formal program of operation prepared by industrial engineers.

•

— Training of your custodial staff.

•

— Regular inspections and reports.

•

— Help on special housekeeping problems.

Whatever your housekeeping objectives – improved plant appearance, lower cost, improved efficiency, better control – you'll be able to achieve them quickly and effectively with Puritan Engineered Maintenance.

P-E-M is a professionally developed and administered program which applies systems engineering techniques to plant housekeeping and sanitation. It standardizes, identifies, defines and schedules housekeeping operations. It provides training for your custodial staff as well as regular inspections to keep your program running smoothly.

Best of all, P-E-M is offered without charge to customers of Puritan sanitary maintenance products.

If your firm employs eight or more custodians, it will pay you to investigate what Puritan Engineered Maintenance has to offer. It can produce outstanding results for your plant, just as it has for hundreds of other leading industrial firms. For information,

WRITE FOR "ENGINEERED MAINTENANCE"

This informative booklet describes P-E-M programming and shows what it can do for you. Send for a copy.

PURITAN CHEMICAL COMPANY

EXECUTIVE OFFICES: 916 ASHBY STREET, N. W. • ATLANTA 10, GEORGIA

PLANTS AND WAREHOUSES: ATLANTA, GEORGIA • HOUSTON, TEXAS • ST. LOUIS, MISSOURI

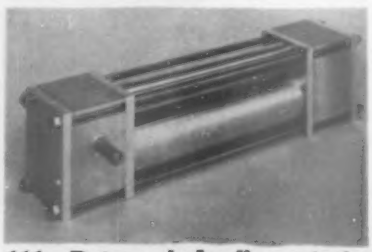
Begins on page 156

EQUIPMENT NEWS

For more data, circle item numbers you want on Reader Service Card.

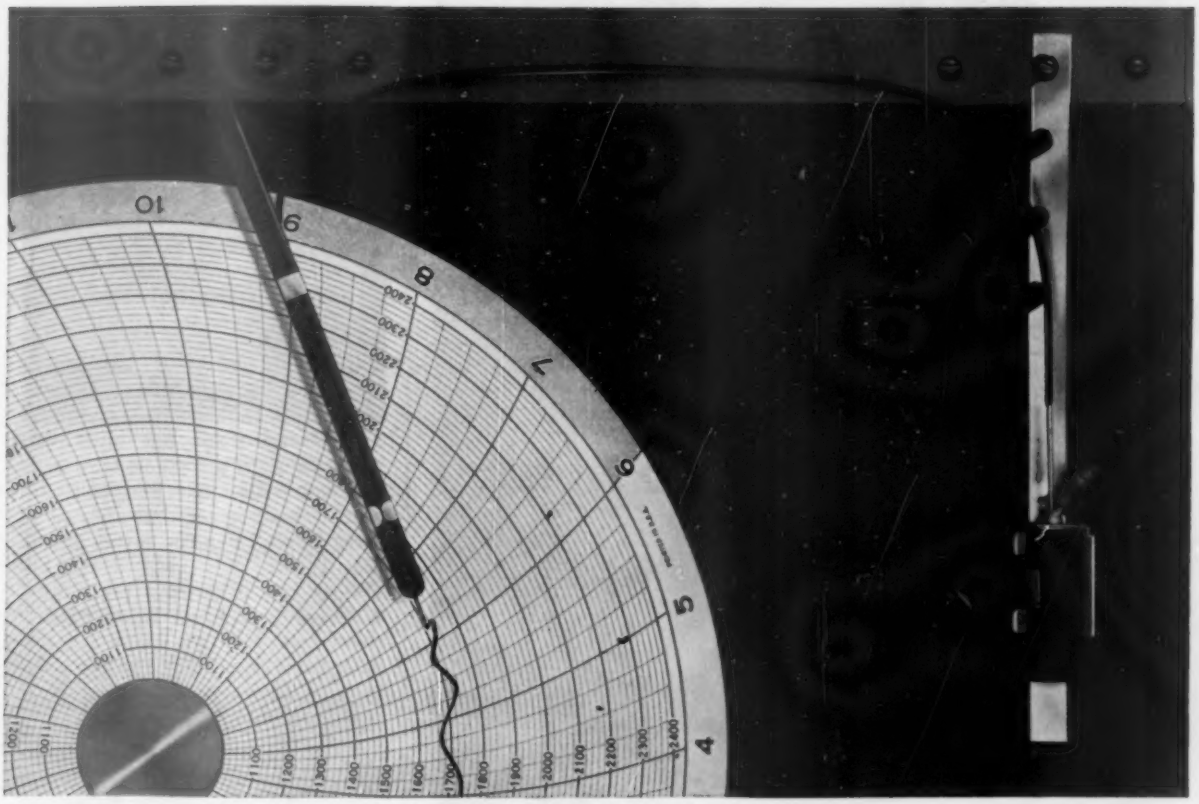
109—Water cooler has shelf and storage door to hold perishable food and cold drinks. Also dispenses 185 F. water for making coffee and other hot drinks. Two trays provide ice cubes four or five times daily. Cool-R-Fridge serves up to 25 people. *Sunroc Corp.*

110—Computer system is moderately priced for medium and large-scale punched card applications. Programing reduced to 20 basic commands. Two high-speed card readers double input capacity. Electronic impulse triggers band for fast feeding. *Burroughs Corp.*



111—Rotary hydraulic actuator uses chain drive and piston sealed in fluid. Has no shafts or rods extending beyond frame. Provides as many turns as desired with constant torque. No backlash; sensitive to minute flow changes. In many sizes. *Graham Engineering Co.*

Turn the page



Esterbrook®

NEW MARK-TROL*

eliminates 95% of the mess and maintenance of round chart recorder inking systems . . .

In 10 minutes, convert present markers with Mark-Trol, a completely sealed capillary system with replaceable ink cartridge . . . adaptable to 90% of all round chart recorders in service today.

Esterbrook's Mark-Trol is a completely new concept in marking systems. Because of its universal design, you can eliminate the messy problems inherent in most round chart inking systems in use today. Because maintenance is reduced to little more than routine inspection, Mark-Trol will pay for itself in a matter of days.

Sealed system eliminates dust, dirt, moisture and mold which clogs open-bucket devices. Operation is thoroughly efficient regardless of location, inside or out, under service conditions of humidity, precipitation, chemical fumes or other foreign matter, and over a wider temperature range —0°F to 145°F. Slip-in, disposable, sealed ink cartridge means ink is never directly handled . . . no messy suction tubes, syringes, droppers; no reservoirs to clean out. Eliminates breakage of plastic bags or glass devices. The cartridge contains a large supply of ink, extending your change cycle from days to months . . . and then in a matter of seconds the cartridge is replaced.

ORDER ONE FOR TRIAL—Mark-Trol has been field-tested for 2½ years—extensively in the power and processing fields. We invite you, however, to make a trial installation of your own with a Mark-Trol unit. Send us the coupon today.

Authorized Distributor:

Technical Recording Chart Division
Graphic Controls Corporation
189 Van Rensselaer St., Buffalo 10, New York

Please send us..... Mark-Trol Conversion Kits at $12.00 each.

Name..... Title.....

Company.....

Address.....

Please also send literature completely describing Mark-Trol. ☐

*Trademark

MARK-TROL **THE ESTERBROOK PEN COMPANY** • Technical Products and Instruments Division

If we don't stock the plier-type tool you need

we'll make it for you

Using an exclusive cost-saving system of matched components, Sargent will design and build the plier-type tool you need for production, product installation, or maintenance. Sargent "Specials" cut, crimp, hold, shape, or perform a dozen other operations.

And Sargent is an experienced hand at making both "special" and standard hand tools. Variations of our compound action or standard action pliers are used by major companies all over the country. Available completed or with blank jaws and frames, you'll find the Sargent system is the answer to the purchase of quality special purpose hand tools in both large or small quantities at economical prices.

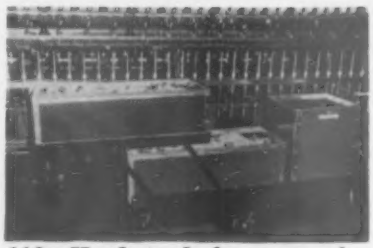
For additional facts send for Sargent's Hand Tool Catalog and Case History book. Write: Sargent & Company, Hand Tool Division, New Haven 9, Connecticut

hand tool division
SARGENT

Begins on page 156

EQUIPMENT NEWS

For more data, circle item numbers you want on Reader Service Card.



112—Hand truck has arms that swing back top receptacle to provide access to bottom one. Permits simultaneous loading and unloading of all three boxes. Handles metal, wood, plastic, etc. For aisle work, operators can pick from both sides. *National Vulcanized Fibre Co.*

113—Automatic control panel reduces weighing, mixing, and batching to pushbutton operation. Can be pre-set to process at high speed up to five separate ingredients. Lever system in main scale has no wearing parts. Built-in alarm for fan failure. *Thayer Scale Corp.*

114—Portable vacuum, with 4-gal. tank, permits operator to clean parts right on bench. Has 340-mph. air velocity and 123-cfm. volume, driven by ¾-hp. by-pass motor. Cloth bag inside tank eliminates external bag and scrap trap. *American Cleaning Equipment Corp.*

Turn the page

For more facts Circle 469 on Reader Service Card

At National Lime and Stone Company

ARMCO LINER PLATE

protects men and equipment from falling rocks

Steel — Strong, Economical, Durable

To gain access to a new limestone source, National Lime and Stone Company, Lima, Ohio, first had to carve a tunnel through solid limestone under a railway roadbed. Due to stratafication characteristics of this formation, chunks of limestone would occasionally loosen and fall into the tunnel.

To provide economical protection, company officials chose an arched lining of Armco Liner Plate, 325½′ long, 13′1½″ high and 16′½″ wide at the base. Traffic was maintained through the tunnel while an Armco Construction Crew installed the protective lining, made from seven-gage galvanized steel.

Other Industrial Uses

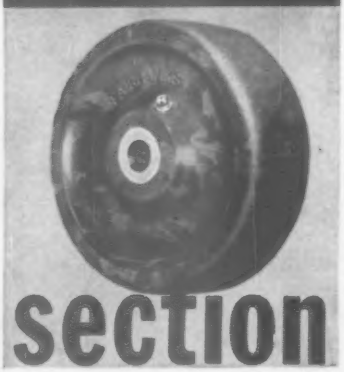
Armco Liner Plates are also used for utility conduits, sewers, industrial underpasses, and storage bins – especially when surface installations cannot be disturbed. Circular Liner Plate structures are available in diameters from 48 to 180 inches.

For further data, call or write us. **Armco Drainage & Metal Products, Inc., subsidiary of Armco Steel Corporation, 7841 Curtis Street, Middletown, Ohio.**

ARMCO Drainage & Metal Products

Now one wheel for any section of your plant

New Lamilon
NYLON-REINFORCED
ALL-PLASTIC WHEELS
(patent pending)



Now, for the first time, you can standardize on one wheel for all your materials handling equipment in any section of your plant. Regardless of the types of floors or floor conditions, Fairbanks new "LAMILON" Wheels will:

- **Protect your floors. "LAMILON" Wheels stay smooth and concentric, will not mar or mark, because of exceptionally high impact strength and abrasion resistance.**
- **Show no affect from oils and greases and a very high resistance to most chemicals. "LAMILON" Wheels have a water absorption factor almost as low as high quality rubber and will not deteriorate in wet floor conditions.**
- **Roll easier with alloy steel roller bearings, hardened steel outer race and provision for pressure lubrication. "LAMILON" Wheels roll easier than semi-steel wheels in most instances.**
- **Last longer and give more dependable service than any other plastic wheel.**

"LAMILON" Nylon-Reinforced All-Plastic Wheels are available in sizes 3 through 12 inches and can be furnished with thread-tight thread guards.

Fairbanks complete line of industrial caster and truck wheels includes the finest vulcanized rubber tired wheels (sizes 3"-18") on the market, solid rubber wheels (sizes 2"-6") and semi-steel wheels (sizes 2"-16").

FAIRBANKS "LOCKWELD" CASTERS WITHOUT KING-PIN

Easiest swiveling, longest lasting. Unique patented "LOCKWELD" construction eliminates king-pin, chief source of caster failure.

Illustration: Series "23" double ball race swivel casters, sizes 3"-8". Single ball race swivel casters, sizes 2"-6" and matching rigids available.

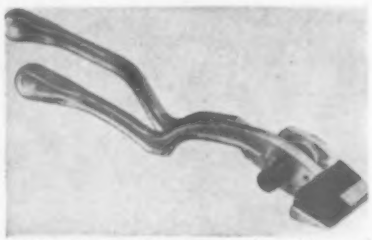
THE **Fairbanks** COMPANY

Executive Office — 393 Lafayette Street, New York 3, New York
Valves • Dart Unions • Casters • Trucks • Wheels
● 520 Atlantic Ave., Boston 10, Mass. ● 393 Lafayette Street, New York 3, New York ● 15 Stanwix St., Pittsburgh 22, Pa. ● 202 Division St., Rome, Ga. ● **Factories** — Rome, Georgia and Binghamton, N. Y.

Begins on page 156

EQUIPMENT NEWS

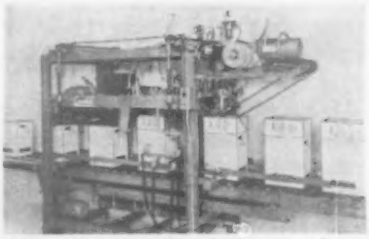
For more data, circle item numbers you want on Reader Service Card.



115—Strap tensioner, for ¾ and 1¼ x 0.35 in. strapping, speeds handling of round or irregular-shaped objects. Breaks strap behind seal; no need for cutter. Has tensioning arc of 230 degrees for use in close quarters. Handle makes tightening easy. *A. J. Gerrard & Co.*

116—"Instant" storage kits contain pre-cut slotted angles ready to assemble into 3- or 4-shelf units for light-duty storing. In 6-, 7-, 8-, and 9-ft. heights, 2-, 3-, and 4-ft. depths, lengths from 36 to 60 in., in 6-in. increments. Assembled in minutes. *Acme Steel Co.*

117—Current limiting fuse uses silver elements hermetically sealed inside ceramic cartridge to prevent deterioration in service. Interrupts 200,000 rms. amp. For use in fusible disconnects, panel boards, power panels. Rated 600 and 250 v., up to 600 amp. *El-Tronics, Inc.*



118—Case sealer indexes, closes top flaps, and completes sealing operation on average size cartons in 9 ft. (including compression). Compact, saves floor space. Handles up to 50 cartons/min. Belts feed, close flaps—no damage to boxes. *General Corrugated Machinery Co.*

Turn to page 170

For complete plant heating you need both...

WING

STEAM, HOT WATER OR HIGH TEMPERATURE HOT WATER*

REVOLVING and DOOR HEATERS

Wing Revolving Discharge Heaters give you:

Uniform heating . . . Warm air is distributed widely and evenly in a gentle flow—no hot blasts or cold areas — heat moves over and around obstacles.

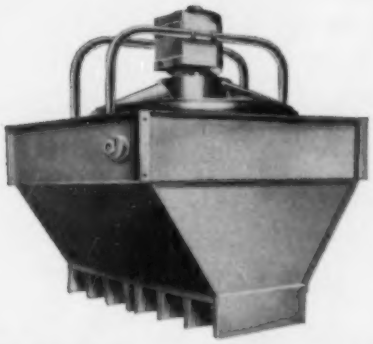
Big area coverage . . . Perfect heating coverage from mounting heights as low as 8′ and high as 65′—areas up to 144′ x 144′ can be covered by a single heater.

No heat stratification . . . All the heat paid for is used — truss area heat is recirculated to the working level — low temperature differentials are maintained.

Low installation cost . . . Fewer Wing Revolving Heaters are required to supply most plant heating needs — you save on wiring, piping and installation labor costs.

Simplified maintenance . . . Tubes are mechanically connected to headers. Individual tubes can be removed or replaced on the job — unnecessary to replace entire heater section.

WRITE FOR BULLETIN HR-6A



Wing Door Heaters give you:

Improved worker comfort and efficiency . . . Large shipping doors are blanketed with high velocity streams of warm air whenever they are opened in cold weather. Incoming cold air is effectively tempered. Nearby workers remain comfortable. Production stays normal. Draft caused illnesses are minimized.

Stabilized plant temperatures . . . The spreading of cold air through large plant areas is avoided even where negative pressures caused by exhaust systems prevail.

Low operating costs . . . Uses steam only when doors are open.

Wide range of sizes . . . Ten sizes are available to suit rolling, overhead or other types of industrial doors. The largest provides protection against outside temperatures as low as −20° F.

Wing Door Heaters can be supplied with Vari-Jet discharge. Automatically converts to perimeter or space heater when doors close.

WRITE FOR BULLETIN DH-2B

**Gas-fired models also are available*

LWC-165

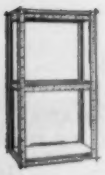
WING

L. J. WING MFG. CO.
DIVISION OF AERO-FLOW DYNAMICS, INC.
LINDEN, NEW JERSEY
FACTORIES: LINDEN, N. J. AND MONTREAL, CANADA
IN EUROPE: WANSON, HAREN-NORD, BRUSSELS, BELGIUM

For more facts Circle 472 on Reader Service Card

IT'S ONE OF OVER 250 NEW ACME

PRE-CUT, READY-TO-ASSEMBLE SHOP EQUIPMENT, IN MOST NEEDED STYLES AND SIZES. Why pay a premium for shop equipment? Why settle for *almost right* design and dimension? Build it yourself from first-of-their-kind kits of Acme Steel's AIM Brand Slotted Angle. Just open the package, grab a wrench—and *go*. Anyone can bolt together tailored-to-the-task storage units, racks, carts, tables and benches. Each package brings you the strength, stability and assembly ease of AIM Brand Slotted Angle . . . but with the added convenience of pre-cut pieces. Everything's there: nuts, bolts, accessories, instructions. And, if your working



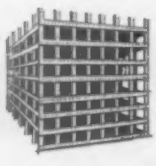
Customized storage units cost no more.

Eighteen sizes of flat bed carts.

Need sturdy steel-topped tables?

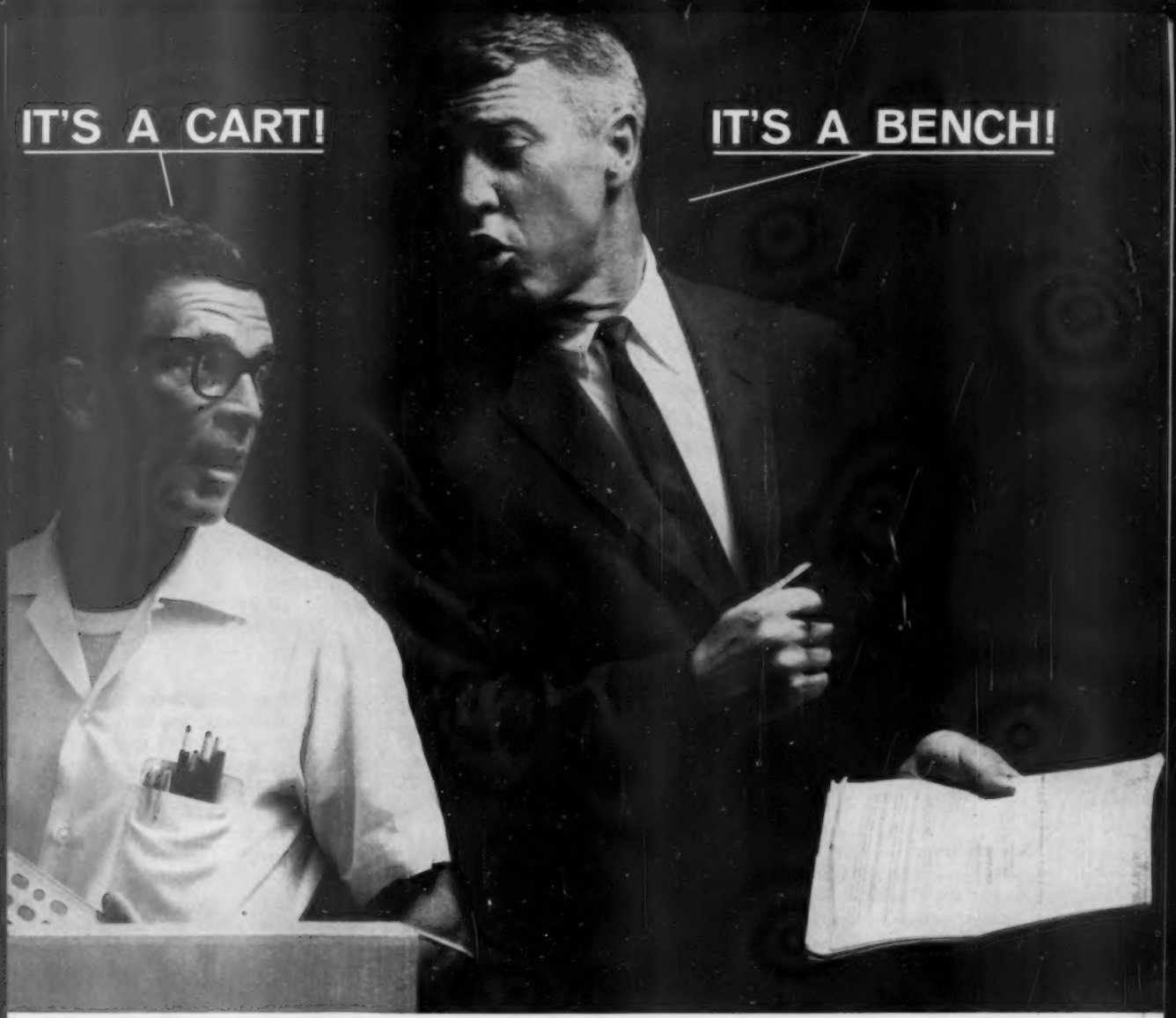
How many of your foremen need a desk?

Store bars and tubes in less space.



Cube type bar racks come in 48 sizes.

Rack your sheet stock at low, low cost.



STEEL SLOTTED ANGLE KITS...

requirements change, so can this galvanized steel framing. It can be adjusted to modify design, dismantled and reused for other jobs. You never have to discard it.

If you have yet to experience the time, material and manpower savings of slotted angle construction, you can now at minimum investment. Your local AIM Brand distributor has full facts. He's in the Yellow Pages under "SHELVING" or "RACKS." Like to see slotted angle in action? Write for our new 24 page idea book, "Creative Framing at Lowest Cost": Fabricated Materials Division, Acme Steel Company, Dept. FAC-111, 135th St. & Perry Ave., Chicago 27, Ill.

ACME STEEL

IDEA LEADER IN

FRAMING - STRAPPING - STITCHING

For more facts Circle 473 on Reader Service Card

No. 111 in a series of washroom survey comments from "SBS soap counselors"

We showed them how to end Soap Waste permanently!

James B. Workman

SBS Soap Counselor on the Eastern Seaboard, has helped many plants update their wash-up practices. Here's his report after surveying a electrical equipment manufacturing plant:

"We observed the usual powdered soap waste in 23 of the 26 washrooms surveyed. Soap scattered about made an unsightly mess of the washbasins, made the floors dangerously slippery and made cleaning-up twice the job it should have been. You could see the plant's hygiene dollars — both manpower and materials — literally disappearing down the drains!

"To correct this problem, we recommended SBS 60, a thick-bodied cream that clings to skin, won't run-off hands or faces like a powdered soap and is almost impossible to waste. They were convinced when we told them that based upon our experience in other plants, a single gallon of SBS 60 will give their employees 2400 economical, waste-free washes!"

Money-saving suggestions like this *begin* with OPERATION PINPOINT–a thought-provoking presentation filled with facts about skin hygiene and washroom maintenance. The SBS soap counselor serving your area can pinpoint the right soap to do every skin cleansing job best and at lowest cost in your plant. Let him show you OPERATION PINPOINT . . . just call your nearest SBS office, collect.

the washword of industry

SBS sugar beet products co.

SAGINAW, MICH. • Los Angeles, Calif. • Newark, N.J.
CANADA: Chemical By-Products, Ltd., Toronto, Ontario

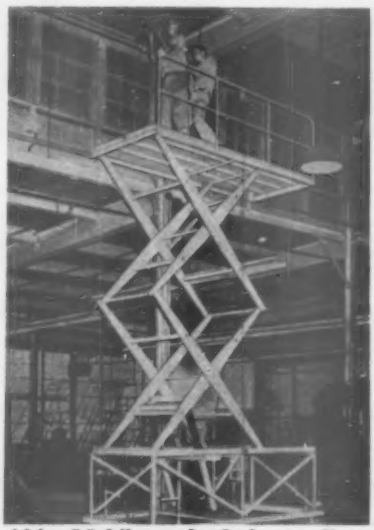
Begins on page 156

EQUIPMENT NEWS

For more data, circle item numbers you want on Reader Service Card.

119—Welding headgear and air-supply protects entire respiratory system. Ambient air is pressurized and filtered of toxic contaminants, or is supplied through plant's compressed air system. Shield can be raised or lowered. *Jamieson Laboratories.*

120—Ceiling suspension system, with fusible links, expands 5/8 in. every 4 ft. at 250 F. Expansion of beam sections toward each other along parallel beam slots prevents ceiling from buckling. Reduces fire damage to beams, piping, wiring. Easy to install. *Flangeklamp Corp.*



121—Mobile work platform adjusts to heights to 12 ft. at touch of button. Hydraulically operated; comes with heavy-duty leveling jacks for uneven or sloping floors. Single or double scissor models. Non-skid, serrated grating on platform. Deadman controls. *Ballymore Co.*

Turn the page

FALK

A GOOD NAME IN INDUSTRY

FALK STEELFLEX COUPLINGS
for industrial applications...large or small

Giant Falk Coupling smooths out steel blooming mill performance

On a blooming mill at the Copperweld Steel Company plant in Warren, Ohio, installation of a large Falk Steelflex coupling between motor and pinion stand eliminated troublesome noise and vibration which threatened to damage mill machinery. Transmitting 5,000 hp at 50/100 rpm, this is not the largest Falk coupling... others are designed to transmit up to 130,000 hp at 100 rpm.

This installation and others like it prove the Falk concept of shaft coupling design—namely, a modern shaft coupling must contribute to the successful performance of the machinery system.

What does this mean to you? Just this: On large machines as well as small, the exclusive Falk grid-groove design does make a difference, and the difference is torsional resiliency with the strength of steel...reason enough to specify Falk Steelflex couplings as "long life" insurance for your connected machinery.

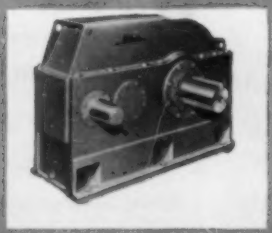
Falk Steelflex couplings are available in standard designs in 34 sizes for applications from .3 hp at 100 rpm to 130,000 hp at 100 rpm, with excellent delivery. Write for Bulletin 4100.

THE FALK CORPORATION, MILWAUKEE 1, WISCONSIN
MANUFACTURERS OF QUALITY GEAR DRIVES AND FLEXIBLE SHAFT COUPLINGS
Representatives and Distributors in most principal cities

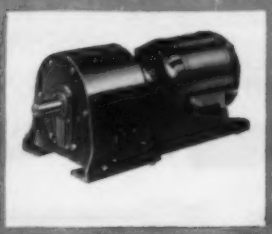
• • •

A Point to Ponder... When you need gear drives or shaft couplings of "FALK OR EQUAL" quality, where but from Falk can you get the "OR EQUAL"?

Other members of America's First Family of Power Transmission Products



SPEED REDUCERS
Parallel Shaft up to 3500 hp. Ask for Bulletin 1100. Also Right Angle and Concentric Shaft designs.



ALL-STEEL MOTOREDUCERS
—up to 75 hp. Horizontal, Vertical, and Right Angle. All-Motor and Integral Types. Ask for Bulletin 3100.

SHAFT MOUNTED DRIVES
—up to 125 hp. Ask for Bulletin 7100. Also Flange Mounted and Screw Conveyor Drives.

FALK, STEELFLEX and ALL-MOTOR are registered trademarks

For more facts Circle 475 on Reader Service Card

you may be overlooking one of your best opportunities to

REDUCE INDIRECT COSTS

In your search for new ways to reduce indirect costs, take a closer look at your fastening tools. These are most likely the busiest tools in your plant, in use hour after hour, day after day . . . and every use offers an opportunity to reduce indirect costs.

Apex fastening tools will help you cut costs every time you drive a screw or run down a nut or bolt. Each Apex tool is designed for use with a specific type and size of fastener. The tool fits the fastener properly, insuring smooth, firm assembly without harming the product or wearing down the tool.

Each Apex tool is carefully heat-treated in Apex' own metallurgical department, insuring the correct degree of toughness and resiliency for your specific application. And every Apex fastening tool is built for continuous, production line use, insuring longer service life with far less downtime for replacement.

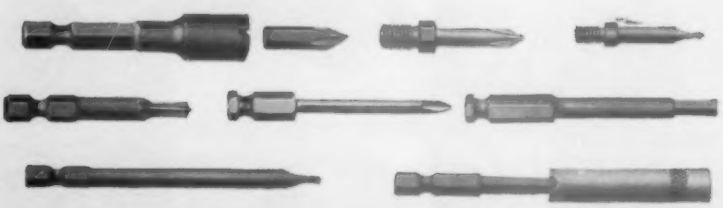
IMPACT/POWER SOCKETS, EXTENSIONS, ADAPTERS, NUT SETTERS, UNIVERSAL WRENCHES, EXTENSION UNIVERSAL WRENCHES

There are over 7,000 types and sizes of Apex Nut Running and Screwdriving Tools, for use with all popular makes of air and electric power tools.

NUT RUNNING TOOLS
Catalog 30-A—¼", 9/32", 3/8", ½", 5/8" square drives, ¼", 5/16", 3/8", 5/8" hex drives.
Catalog 30-B—¾", 1", 1¼", 1½", 2½", 3½" square drives, 7/16", 5/8", ¾" hex drives.
Catalog 30-D—Specials and Spline Drive.

SCREWDRIVING TOOLS
Catalog 30-C—Standard and Magnetic.

BIT HOLDERS, INSERT BITS, POWER BITS, FINDER SLEEVE ASSEMBLIES, HAND DRIVERS



FASTENING TOOLS

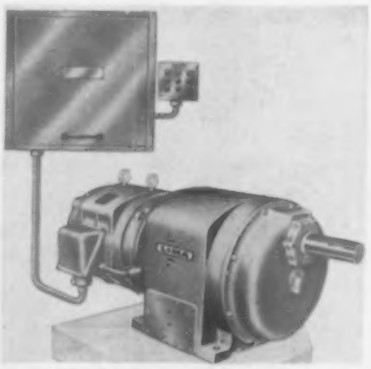
Begins on page 156

EQUIPMENT NEWS

For more data, circle item numbers you want on Reader Service Card.

122—Fork truck has power steering and an engine-hour meter as standard equipment. Dual drive tires provide traction and high stability. Gas powered; 6000 lb. capacity. Turning radius, 104 in.; 108¼ in. long, 87 in. high. Three transmissions. *Baker Industrial Trucks Div.*

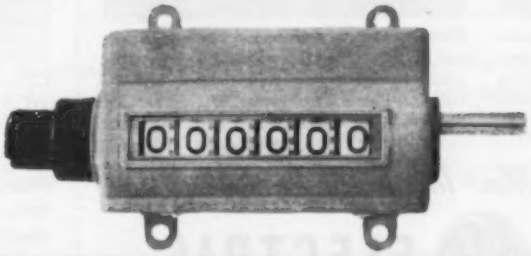
123—Two-way mobile radio features 100 watt VHF amplifier and compact under-dash transmitter-receiver. Amplifier is available alone to up date existing 10- to 30-watt equipment. Can be used with any FM mobile radio unit for 100-watt output. *Aeronautical Electronics.*



124—Multiple speed drive uses hydraulic clutches activated by solenoids to shift to any of 6 speeds while running under full load. Shifting is remotely controlled from pushbutton station. Reverse or forward operation. In 20 to 40 hp. *Lima Electric Motor Co.*

Turn the page

Now numbers big enough to see at 20 feet . . . on the Veeder-Root Visicounter! No squinting, no stretching with the new Visicounter. This counter, with larger than ordinary figures, provides easy readout for difficult-to-see locations. And, no matter how hard your machinery jiggles or punches, the Visicounter goes right on scoring because it's built to take it. Whether you're designing new machines or boosting efficiency of present equipment, you'll find that it pays to check into Visicounter. Write: Mechanical Section, Veeder-Root Incorporated, Hartford 2, Conn. **count on...Veeder-Root**



Visicounter is available in ratchet types, with speeds up to 500 counts per minute, or in geared types with up to 1,000 counts per minute. The new figures, larger and sharper, are another example of Veeder-Root design for maximum efficiency.

Built to take it! G-E 30A Switch

You can trust this General Electric heavy-duty switch to do tough, full-load switching jobs, year after year. You get large, silver-plated, double-wipe contacts and a sturdy, lubricated mechanism — in a strong, well-insulated housing with a rigid, plated strap. 30A, 250V; 30T, 125V; 1½ hp @ 250V AC; 1 hp @ 125V AC. Specification Grade. Single-pole, double-pole, 3-way — in ivory or brown. Shown here: GE5196-1 (single-pole, brown.)

Heavy, clamp-type terminals grip wires like a vise, for safe, enclosed connections. Long, plated, plaster-cleaning mounting screws — held captive in strap — simplify your installation.

Handy test-prod holes save pulling switch out to test circuits. Ask your G-E distributor to show you this rugged switch. General Electric Company, Wiring Device Department, Providence 7, R. I.

Progress Is Our Most Important Product

GENERAL ELECTRIC

Begins on page 156

EQUIPMENT NEWS

For more data, circle item numbers you want on Reader Service Card.

125—Sealant gun dispenses adhesives, epoxys, polysulfides and silicones from removable polyethylene cartridge by squeezing mechanical trigger. Useful where air pressure is not available. Cartridge may be refrigerated for later use. Under $7. *Pyles Industries, Inc.*

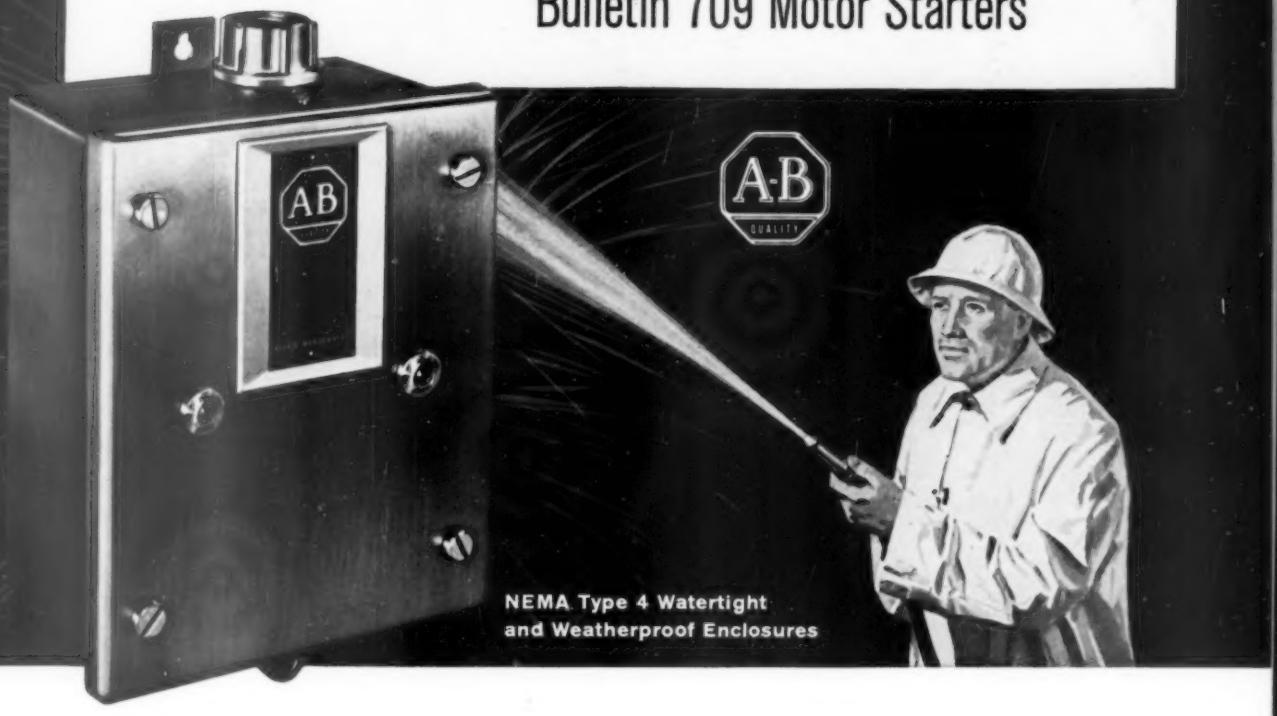
126—Static magnetic switch activates solenoid for on-off or continuous operation. Self-contained input control circuit uses only 5 ma. For small hp. reversing motors, solenoid valves. No maintenance. Rated 40 watts, 600 on-off cycles/min. *Magnetics, Inc.*

127—Mobile spray cleaner delivers 10 gal. per min. at 500 psi. Permits one man to clean building and equipment with only cold water and detergents. Nozzle adjusts from spray to stream. Shut-off valve stops chemical but permits flow of rinse water. *Hayes Spray Gun Co.*

Turn to page 178

Allen-Bradley Nema Type 4

STAINLESS STEEL ENCLOSURES for New Bulletin 709 Motor Starters

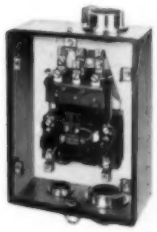


NEMA Type 4 Watertight and Weatherproof Enclosures

Complete Protection Against Water and Weather!

Allen-Bradley's revolutionary, new line of Bulletin 709 motor starters, which includes reversing switches, multi-speed starters, combination starters, etc., is now available in stainless steel enclosures. Thus the benefits of reduced size, increased interrupting capacity, increased life, and longer trouble free operation can be given to all outdoor installations, or where a great deal of moisture is present. Designed for installation in dairies, breweries, meat and food processing plants and similar locations where a daily "wash-up" is required, the "eye appeal" of these stainless steel enclosures will also be an asset.

The standard Nema 4 enclosures are made of heavy gauge Type 302 stainless steel. However, Type 316 stainless steel can be furnished at a correspondingly higher price. There are many other features about these revolutionary starters that will interest you. Therefore, please write for Publication 6100: Allen-Bradley Co., 1316 South Second Street, Milwaukee 4, Wisconsin.



BULLETIN 709 SIZE 2
in watertight, weatherproof Stainless Steel Enclosure—for use where a great deal of moisture is present, such as tanneries, food processing plants, pump houses, dairies, breweries, etc., or in outdoor locations.

21-61-RM

ALLEN-BRADLEY

Member of NEMA

QUALITY MOTOR CONTROL

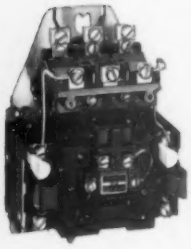
Buy Allen-Bradley Combination Starters— nowhere can you get

AS MUCH

FOR YOUR MONEY!

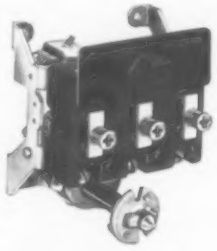
Bulletin 712 Size 1
combination starter with fused disconnect switch in Nema Type 1 enclosure.

The new A-B Series K starter and new A-B disconnect switch in a single enclosure provides complete safety for the operator and the production machine — because the cabinet door cannot be opened until the disconnect is OFF. Also, this "safer" combination starter costs less to install than a separate starter and disconnect switch. There is a neatness about such installations—it is the mark of being up-to-date! Publication 6100 will supply you with complete details—better write for it today: Allen-Bradley Co., 1316 South Second Street, Milwaukee 4, Wisconsin.



A Starter Design Based on 30 Years of Field Experience

The new Series K starters have been completely redesigned for many *more millions* of trouble-free operations. The new magnet is cushioned to reduce wear. The new molded coil is protected against all harmful atmospheres. The new weld-resistant contacts close without wear-causing sliding motion.



Visible Contact Disconnect Switch

When the front-operated disconnect switch is in the OPEN position, all three contacts are clearly visible as being open. An easily removable insulating guard prevents accidental contact with the incoming lines. The double-break, silver alloy contacts operate with positive snap action.

Safety Cover Latching

The door of the enclosure can be opened *only* when the disconnect switch is in the OPEN position. However, it may be opened by *authorized* personnel while the disconnect is closed by means of a hidden defeater screw. Incidentally, this defeater can be made inoperative.

Extra Safety Padlocking

The operating handle can be locked in the OFF position with as many as three padlocks. When desired, means to lock the disconnect switch lever in the ON position can be provided. In addition, the enclosure door can be padlocked closed, with the handle free to be operated.

Can also be supplied as Bulletin 713 combination starter with circuit breakers

21-61-RM

ALLEN-BRADLEY

Member of NEMA

QUALITY MOTOR CONTROL

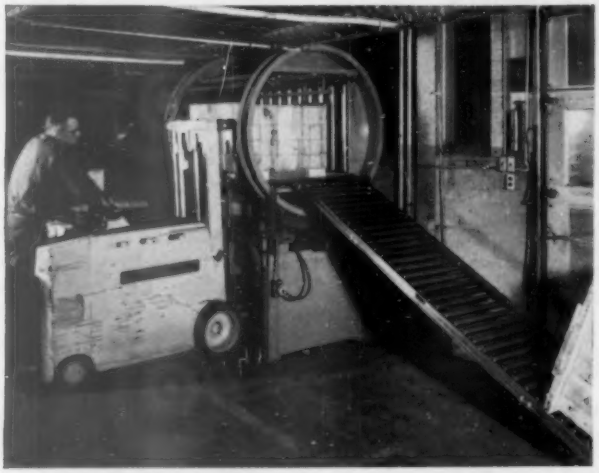
RAPISTAN Ideas HANDLING

HOW "TECHNICS" PLANNING PAYS "COMPOUND SAVINGS"

In any business, whether yours is a manufacturing plant, a wholesale warehouse, a retail or chain operation, or a service industry, materials handling is the one function that is closely related to all the other management arts.

Because of its influence on so many other departments and functions, it can be utilized as a management tool, to coordinate methods improvements throughout an organization, directed toward the common goal of reduced operating costs and increased profits.

This principle is the basis of Rapistan's proven "Technics" approach to cost reduction. It starts with the materials handling system, in all its aspects; then, extends the benefits of improved materials flow to produce subsidiary benefits in other areas of management as well.



New containerization of these conveyor wheels, specified by Purchasing, coupled with a new automatic unloading device designed by Plant Engineering, speeded truck unloading to 1/12th the former time. Wire-bound crates are designed for re-use as finished goods shipping containers for a further saving.

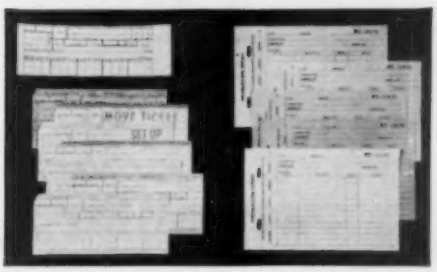
Thorough Planning—The Key

Rapistan's "Technics" concept of materials handling goes an important step beyond solving the problems of movement, transfer, storage and flow control. It recognizes the inter-relationships of the flow system with other management functions—purchasing, industrial engineering, product design, manufacturing, quality control—even clerical procedures.

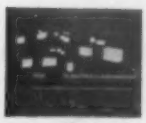
By thorough planning, to augment and capitalize on improvements in the flow system through all related management activities, a "Technics" plan gives management maximum return on its investment.

A successful Technics program requires skillful coordination, under centralized and authoritative direction. Only top management can provide this. But, by the nature of his specialization, the materials handling engineer can contribute much to such a program. Your Rapistan sales engineer can offer new ideas and techniques of materials handling. And, his knowledge of "Technics" principles can help you compound the savings in many related phases of your total operation.

Plant engineers who designed this transfer mechanism to match Rapistan live storage Flow Racks helped make the entire system more efficient and versatile. Such contributions illustrate relationship between plant functions and materials handling, developed through Technics planning.



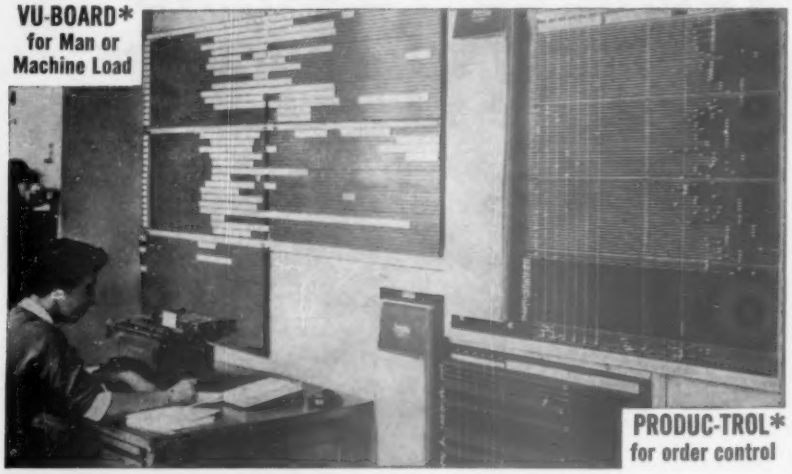
IBM data processing is coordinated with the flow system in this successful Technics program. These cards trigger movement of raw materials and work in process into and out of storage, and over the conveyor system between manufacturing operations.



This new brochure illustrates "Technics" planning at work in the management of materials, solving problems of inventory control, order selection and similar warehousing functions for manufacturing and distributing firms. For your copy write to The RAPIDS-STANDARD CO., Inc., 549 Rapistan Bldg., Grand Rapids 2, Michigan.

Rapistan®
CONVEYING EQUIPMENT

Another Wassell Product



Wassell TWINS "Speed Up Operations" for two more top manufacturers

Top manufacturers of resistors:

"With Produc-Trol providing visible information on approximately 2,000 active open orders, we can now tell at a glance how the order stands within two hours of its actual movement through our manufacturing facilities."

Top maker of precision bearings:

"Produc-Trol and Vu-Board have made our production control far easier than at any time in the past.
"More accurate scheduling, both quicker and better planning, better customer relations are some of the benefits we've gained."

These are just two of over 30,000 top businesses which find Wassell visual control systems give the only comprehensive picture of all the vital factors at a glance. Thus, problems are anticipated, bottlenecks avoided, and sound decisions made.

Wassell Organization, Inc., pioneers of visual control, have trained representatives in sixty cities prepared to help you plan a visual control system which will save both time and dollars. Please look under Wassell in the phone book or use the coupon below.

* Each order promised on Produc-Trol is time checked by machine, man or department load on Vu-Board

WASSELL ORGANIZATION INC.
DEPT. F-11 • WESTPORT, CONN. • CAPITAL 7-4111 • EST. 1935

Please send me details on how your Wassell Twins – Produc-Trol and Vu-Board contribute to greater plant productivity.

NAME_____ TITLE_____

COMPANY_____

ADDRESS_____

CITY_____ ZONE_____ STATE_____

Some valuable, exclusive Wassell franchises are available. Please write for an interview.

Begins on page 156

EQUIPMENT NEWS

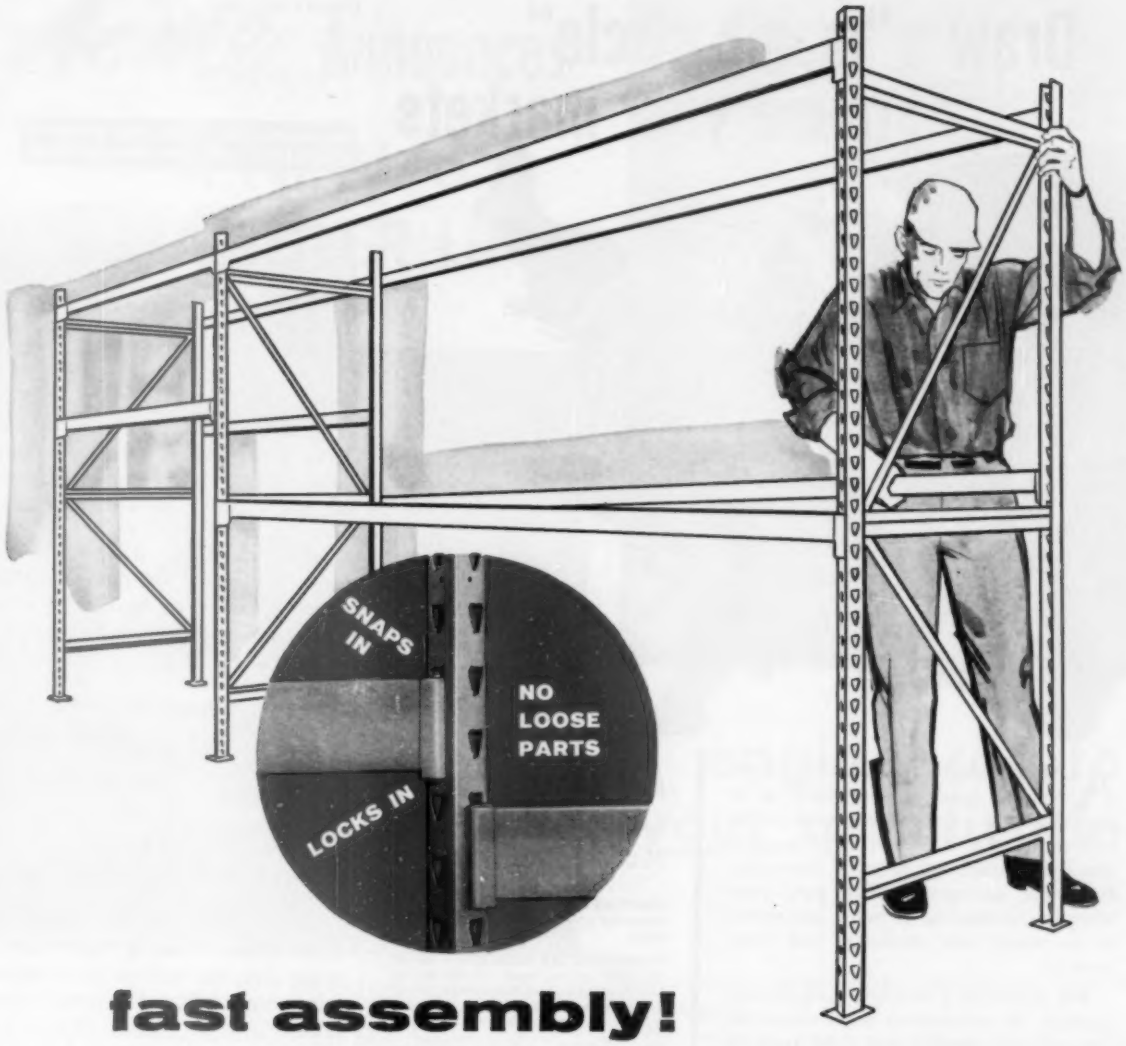
For more data, circle item numbers you want on Reader Service Card.

128—Lift truck, 3000-lb. capacity, permits safe, fast stock picking from 12 to 18 ft. high racks or shelves by one man. Operator controls platform height, braking, raising, and lowering. Easy to steer. Lifts to 128 in. Can be remotely controlled. *Lift Trucks Inc.*

129—Infra-red burner, gas fired, comes in easy-to-couple sections. Forms continuous radiant panels (to 200 ft.). Side-by-side mounting forms panels of various sizes, shapes. Multiple mounting needs only one pilot light and sensing device. Heats to 1600 F. *Pyronics, Inc.*

130—Power regulator, solid state, allows manual or automatic adjustment of a-c line voltages. Output variable from 0 to full power in response to 0-to-5-ma. control signal. Ratings to 20 amp., 115 and 230 v. For ovens, furnaces, small kilns. *Research, Inc.*

Turn the page



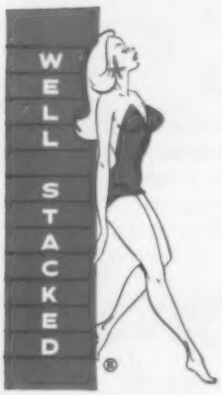
fast assembly!

EMI *air-row head* pallet racks

only 2 basic parts—fast assembly—easy to relocate.

EMI *air-row head* DRIVE-IN RACKS
EMI *air-row head* DRIVE-THRU RACKS

These strong, efficient, space-saving racks are all engineered on the AIR-ROW Head principle with basic interchangeable parts.



EQUIPMENT MFG. INC.

21561 HOOVER ROAD • DETROIT 5, MICHIGAN

Before you build, remodel or add to a storage area, FIND OUT ABOUT AIR-ROW HEAD RACKS

WRITE FOR DETAILED INFORMATION

YOU CAN STACK ANYTHING ON **EMI** RACKS

For more facts Circle 482 on Reader Service Card

Draw a "magic circle" around your markets

ALMOST one-fourth (22.4%) of the Nation's total buying power is in Kentucky and its bordering states—over half the total Continental U. S. population lives within 400 miles of Kentucky. No other uncrowded state puts your company so close to so many customers, to so many raw materials and components.

But Kentucky's strategic geographical location, its tremendous water resources, rich mineral deposits and great reserves of energy sources only partially explain why this State is growing 55% faster than the national average.

Other reasons become obvious when you visit Kentucky. Early in 1960, Governor Combs and Lt. Governor Wyatt announced a 25-point program to supplement the State's abundant natural advantages. *Today, every one of the projected activities has been actually launched.* And Kentucky's growth is now setting new records.

We would like to show you how Kentucky's unique combination of natural and man-made advantages can mean greater progress and profits for *your* company. Address: Lt. Governor Wilson W. Wyatt, or E. B. Kennedy, Commissioner, Department of Economic Development, 500 Capitol Building, Frankfort, Kentucky.

And Kentucky offers much more than location advantages

FINANCING PLANS – more industrial financing plans (five) than any other State.

TRANSPORTATION FACILITIES – served by 4,000 mi. of track, 20,000 mi. of State-maintained highways, more miles of navigable rivers than any other State, seven major airlines.

POWER SUPPLY –sufficient public and private reserve capacity readily available in Kentucky to supply the needs of any new or expanding industry.

WATER RESOURCES – Kentucky has adequate ground and surface water to fulfill *all* your present and future needs.

LABOR FORCE – survey of Kentucky's 1,000 largest manufacturers shows 94% consider their labor productivity from average to very high.

COAL RESERVES – third-largest bituminous coal-producing State with two large, widely separated fields.

NATURAL GAS –more than 90 of Kentucky's 120 counties have natural gas.

RAW MATERIALS–*Natural:* coal, natural gas, oil, limestone, silica sand, fluorspar, ball and fire clay, timber. *Manufactured:* chemicals, metals, plastics, coke, synthetic rubber, to name a very few.

RESEARCH FACILITIES – New Spindletop research facility is a three-way partnership involving the State, University of Kentucky and private industry.

COMMONWEALTH OF
KENTUCKY
WHERE BIG THINGS ARE HAPPENING

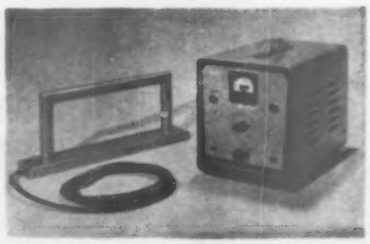
Begins on page 156

EQUIPMENT NEWS

For more data, circle item numbers you want on Reader Service Card.

131—Conveyor diverter automatically shunts closely spaced cartons off main conveyor onto predetermined spur at speeds to 300 ft./min. Fragile contents undamaged by gentle shunting. Rotating rubber wheels (inset) swing carton onto spur. *General Atronics Corp.*

132—Chain wrench operates in either direction without removing or refastening when changing directions. Needs only ¾-in. clearance to apply; especially suitable for hard-to-reach spots. Handles ⅛- to 4-in. pipe. Extra links may be added to chain. *Ridge Tool Co.*

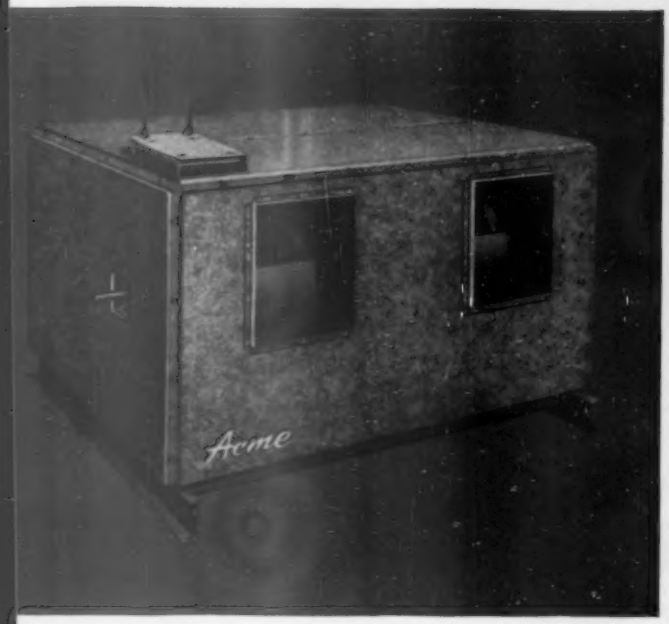


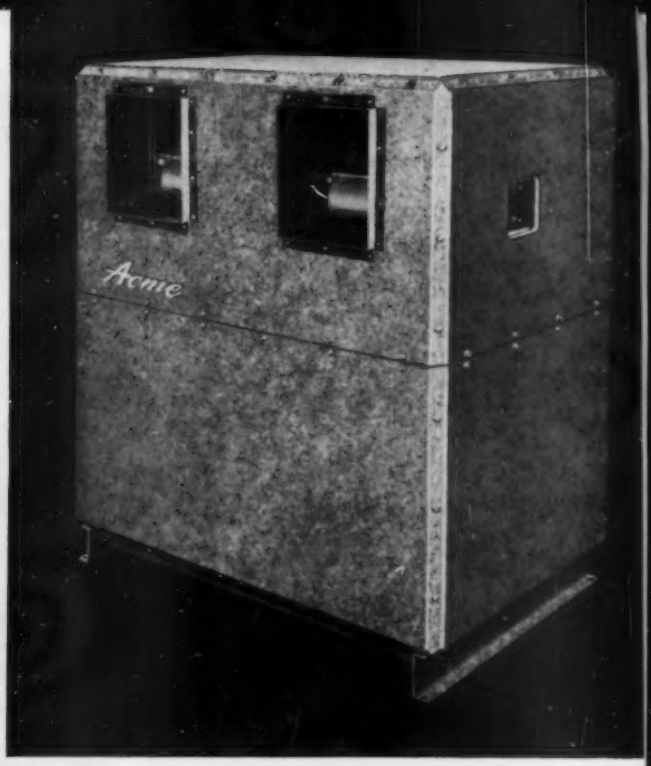
133—Metal detector, highly sensitive, uses radio frequencies to spot magnetic or non-magnetic metals and alloys. Finds tramp metal in bulk materials or finished products packaged in non-metallic containers. Search coil is custom-shaped and sized. *Morehouse Machine Co.*

Turn the page

Acme Announces

A NEW AIR HANDLER LINE





engineered to your specifications

After years of intensive laboratory and field research and development work, Acme is proud to announce *a new advanced-design line of air handlers* for heating, ventilating and cooling applications . . . a line that features a host of engineering and construction refinements most wanted by architects, consulting engineers, contractors and building owners nationwide.

Installation flexibility, for example . . . to meet virtually any requirement you may have . . . is provided in several ways. From two to four coil sizes, in either right or left-hand combinations, are available in each casing size . . . six motor positions and four fan positions are offered . . . and on multi-zone units, mixing and filter boxes may be arranged vertically or horizontally.

All sections are made from rolled sheet steel, angle irons are eliminated, corner post construction offers greater strength and rigidity. Panels, built on specific centers, are securely fastened with self-tapping, hexagon head screws to prevent air leakage, facilitate panel removal when necessary.

Only external, sealed self-aligning "Sealtite" ball bearings with "Alemite" fittings are used to simplify service and maintenance. Fan mount shafts are hollow, designed and sized to minimize shaft deflection, increase bearing life.

There's more, much more . . . including the fact that the line includes 37 different horizontal, vertical and multi-zone type units, 14 sizes, capacities to 44,000 cfm. An Acme Air Handler for every application. For complete details, fill out coupon below and mail it today.

Acme INDUSTRIES, INC.

JACKSON, MICHIGAN • GREENVILLE, ALABAMA

MANUFACTURERS OF QUALITY AIR CONDITIONING AND REFRIGERATION EQUIPMENT SINCE 1919

ACME INDUSTRIES, INC.
JACKSON, MICHIGAN

GENTLEMEN: Please send, immediately, literature on your new Air Handler line.

NAME _____

COMPANY _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

Get 500 KVA CAPACITY and SAVE SPACE too!..

with new Power-Zone Unit Substations

Square D's new design provides every feature you could want in a packaged unit substation. New **Power-Zone substations** are really compact, are **available in capacities** from 75 to 500 3-phase KVA —primaries to 4800v, secondaries to 600v. Here's **why, feature for feature,** Square D Power-Zone unit **substations are the best** you can buy.

Quiet-operating • Ideal for areas where transformer hum is disturbing. Guaranteed maximums of 50 db for 300 KVA and 53 db for 500 KVA—8 and 7 db respectively below latest NEMA standards.

Extra safety • High voltage compartment door interlocked—switch must be open when door is open. A safety-glass window in the door lets you inspect switch, fuses and compartment without opening the door—you can see you're safe. Steel barriers isolate high voltage, low voltage and transformer sections.

Easy installation • Substation delivered completely assembled and wired. No need to remove fuses or other equipment to install power wiring. Greatly reduced weight helps handling. 10-inch gutters in low voltage section give ample wiring space. Strong continuous base makes moving on rollers easy, eliminates substation floor to simplify bottom conduit entrance.

Easy to use • Rotary tap changers assure correct contact pressures, prevent loose connections or stripped terminal threads. An expanded metal grille in the top allows easiest transformer inspection—just lift the protective hood. Grille can be removed for normal transformer cleaning. Efficient ventilation system gives cool operation, long transformer life. Requires only 19 sq. ft. floor space. No rear or end aisles necessary—all components front-accessible.

Wide versatility • Power-Zone unit substations can contain a high-voltage air interrupter switch, fused or unfused, or oil-filled cutouts. Low-voltage molded case breakers—metering equipment—QMB fusible switches, circuit breakers, motor starters—all can be supplied. Special components or metering available in extra sections on both high and low voltage ends. Forced air cooling system available to increase KVA capacity by as much as one-third.

Get the complete story • Write Square D Company, Mercer Road, Lexington, Kentucky, or contact your local Square D Field Engineer

SQUARE D COMPANY

wherever electricity is distributed and controlled

For more facts Circle 485 on Reader Service Card

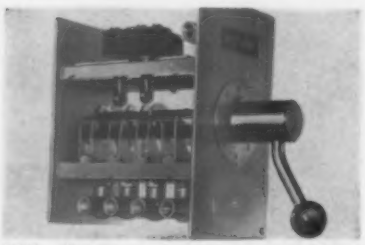
Begins on page 156

EQUIPMENT NEWS

For more data, circle item numbers you want on Reader Service Card.

134—Portable hydraulic lifter needs only one man to lift up to 320-lb. load 36 in. high and move it from place to place. No danger of strain. Jiff Lift handles machinery, heavy parts, and packages. Optional accessories for extra heavy loads. *Grand Specialties Co.*

135—Pressure regulator, for about $4, offers ±1% accuracy in unit measuring 2¼x1 7/16 in. Handles gases and fluids (to 400 psi.) that do not affect brass or neoprene. Has 5- to 125-psi. output, ¼-in. NPT inlet and outlet, operating temperatures to 200 F. *Wilkerson Corp.*



136—Process programer allows one-knob control of multiple, sequential functions in process or machine. Knob turns square camshaft 360 deg. Cams act in predetermined sequence upon pneumatic valves or miniature switches. *Dynak, Inc.*

Turn the page

The Shortest Distance Is OVERHEAD

With Shepard Niles JOB-MATED Cranes

Traveling cranes deliver the goods **directly,** from point to point within your plant or warehouse, or even from one building to another.

They move masses of material faster, more efficiently–speed up production–because they travel **over** obstacles, not **around** them. And they leave passageways, work areas, and grounds free of moving equipment, with greater safety for your employees and materials.

Best of all, traveling cranes allow you to increase your useable storage capacity by eliminating aisles, and enabling you to store material up to the beams.

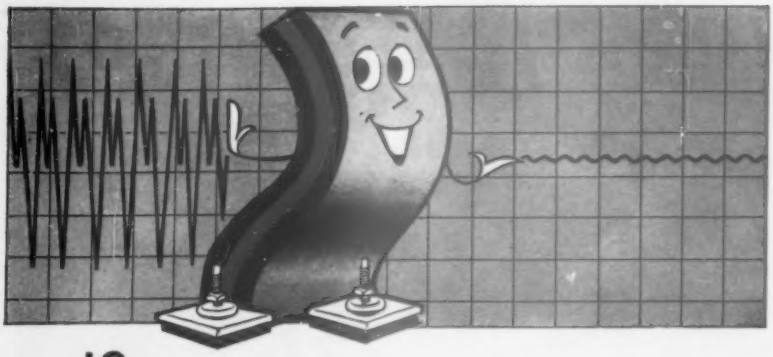
Shepard Niles JOB-MATED Cranes with auxiliary hoists are not merely handling devices, but versatile, highly engineered machine tools that contribute directly to increased production and profits. You'll find them ideally suited for your production and storage requirements. Write for complete details on how Shepard Niles JOB-MATED Cranes will improve your profit picture.

Member of Electric Overhead Crane Institute
America's Most Complete Line of Cranes and Hoists

SHEPARD NILES
CRANE AND HOIST CORPORATION

3362 Schuyler Ave., Montour Falls, N.Y.

For more facts Circle 486 on Reader Service Card



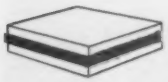
IS

VIBRATION

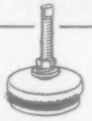
ROBBING YOU BLIND?

Transmitted vibration in your plant or office is a universal culprit that keeps attacking your costs and operating efficiency in a hundred ways . . . unless checked at its source.

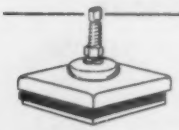
Unisorb machine mounts — either pads or Level-Rite devices — reduce up to 85% of this transmitted vibration and provide a practical, low-cost solution to almost all vibration problems. Unisorb Vibration Control reduces noise, worker fatigue and human inefficiency. Unisorb will reduce maintenance of buildings and machines, cut down-time and simplify machine installation. In addition, tests show that Unisorb permits running machines at higher speeds and closer tolerances for increased production and improved quality.



Unisorb Mounting Pads
Unisorb pads are the basic vibration control unit, identified by the red centers and brand mark. Available in a wide range of densities and thicknesses for proper application. Saves up to 80% in installation time and costs.



Unisorb Level-Rite 200
Unisorb Level-Rite "Junior" has been especially designed for light machines, air conditioners, business machines and similar equipment. A low cost, precision leveling device and vibration control unit, with loading limit of 200 lbs. per unit. Ideal for original equipment.



Unisorb Level-Rite Mount
Unisorb Level-Rite is a universal, self-contained leveling device for all types of machines. Fast, simplified way to achieve and hold precise level. Available with exclusive screw-post design or as a basic mounting plate for use with built-in leveling devices.

Remember — to simplify installation, improve performance and control vibration . . .

UNISORB MOUNTS MAKE THE DIFFERENCE

. . . for all types of machines from laboratory equipment to giant presses.
Ask for a Money-Back Trial . . . Now!

UNISORB

UNISORB 206 SOUTH STREET, BOSTON 11, MASSACHUSETTS

Division of The FELTERS Company New York, N. Y. • Chicago, Ill. • Detroit, Mich. • Upper Darby, Penna. • St. Louis, Mo. • Taylor Felt & Supply Co., San Francisco, Calif. • Acorn Mfg. Co., Los Angeles, Calif.

Please send me a Unisorb Sample and Free Book.

Name.....

Company.....

Address.....

City.....Zone....State.....

FED-61

Begins on page 156

EQUIPMENT NEWS

For more data, circle item numbers you want on Reader Service Card.

137—Tite-Seal headgear makes any gas mask airtight in just 4 sec. Two quickly adjustable ratchet settings provide permanent fit. Fits easily under fire helmets or safety hats. Adjusts comfortably to any head. Lightweight, durable, easy to clean. *Willson Products Div.*

138—Oral resuscitator permits rescue breathing into mouth without personal contact. Tube with flexible face mask has one-way valve to direct victim's breath to atmosphere instead of to rescuer. In plastic box for wall mounting or pocket pack. *Venti-Breather Products, Inc.*

139—Side-shifting attachment for lift trucks shifts forks 4 in. to either side of center. Hook-type hydraulic unit hangs on standard fork plates. Increases maneuverability. Brass strip minimizes wear on bottom. Capacities to 10,000 lb. *Little Giant Products, Inc.*

140—Pistolmeter measures all normal current, voltage, and resistance values. Revolving jaws at muzzle-end fit into cramped gutters, cable boxes, etc. Trigger-operated probe light. Meter needle can be locked. Fits into holster. *Federal Pacific Electric Co.*

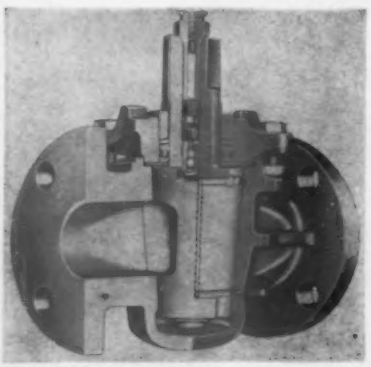
Begins on page 156

EQUIPMENT NEWS

For more data, circle item numbers you want on Reader Service Card.

141—Two-way radio has audio output of 5 watts for reception in high-noise areas. Draws only 9.6 watts from battery. Transistorized and ruggedly built to withstand lift truck abuse. Also walkie model which operates for 9¢. Battery packs last up to 12 days. *Motorola, Inc.*

142—Mobile Airveyor picks up dusty materials on vacuum side, discharges at pressure side. Automatic filter separates incoming material from conveying air. Element is cleaned continuously by valve driven by ⅛-hp. motor. For 3- and 4-in. conveying lines. *Fuller Co.*



143—Fluid control valve has thin, high-lubricity plastic coating that minimizes turning friction, reduces maintenance. Preset at factory—needs no further adjustment. Won't stick or freeze. In ¼ to 36 in. sizes, pressures to 1000 and 10,000 psi. *Rockwell Mfg. Co.*

Turn to page 188

1. INSTALL MACHINERY FAST
2. LEVEL 3. LICK VIBRATION

NEW LEVEL-RITE SERIES 500

Cut machinery installation time and costs up to 70, 75, even 80% . . . eliminate transmitted vibration up to 85%! That's the money-saving move with Level-Rite Series "500" — latest member of the Unisorb family. No lagging, no cement, no drilling, no "hit or miss" spotting is needed. Unisorb Level-Rite mounting is fast — machines can be moved and relocated quickly and with a minimum of downtime.

Level-Rite Series "500" is a self-contained leveling mount for light and medium duty machine shop tools. It withstands weights up to 750 lbs. Send for literature.

SPECIAL ADVANTAGES: Fast, simplified, precise leveling • Free-floating screw post — compensates for uneven floor • Safe, sure grip — can be cemented if needed • Lowers noise level — increases worker efficiency • Better machine performance (improved alignment) • Available in many types and thicknesses for all machine types • Money-back trial is yours for the asking.

FCO-43

UNISORB

UNISORB 206 SOUTH STREET, BOSTON 11, MASSACHUSETTS
Division of The FELTERS Company
New York, N. Y. • Chicago, Ill. • Detroit, Mich. • Upper Darby, Penna. • St. Louis, Mo. • Taylor Felt & Supply Co., San Francisco, Calif. • Acorn Mfg. Co., Los Angeles, Calif.

Please send me a Unisorb Sample and Free Book ☐
Please send literature on Unisorb Level-Rite "500" ☐

Name.....
Company.....
Address.....
City.....Zone.....State.....

5041
DRAW
SPEED
DYNAPAR CORPORATION
REMOTE INDICATOR
TYPE
SER.

PROCESS CONTROLLER

ROTOPULSER

New product news from Louis Allis

NOW...Louis Allis offers DYNAPAR* Digital Control Systems!

Louis Allis can supply accurate digital controls designed to industrial standards for a wide variety of continuous process lines

For any production process, Louis Allis can furnish not only motors, drives, and controls, but also digital monitoring equipment to provide visual readout and process control signals.

The answer is DYNAPAR* Digital Control — a highly accurate digital logic system that can count, measure, totalize, indicate, time, or control depending on the requirements of the application. Digital systems are ideally suited for high speed counting — accurate measurement of speed and draw — automatic cutting-to-length — automatic positioning — and many other applications.

Dynapar's digital devices utilize precise pulses, and eliminate the drift inaccuracy inherent in magnitude-measuring analog systems. There's no need for constant calibration or adjustment. Pulses are reliably provided by rugged ROTO-PULSERS, highly stable sensing and pulse generating devices — visual indication is obtained by easily-read luminous direct numerical readouts. Control functions are accomplished by a variety of special devices tailored to specific operations. All DYNAPAR equipment features the most modern solid-state transistorized circuitry to provide long-life operation without maintenance.

Investigate to see how Louis Allis-Dynapar equipment can increase production and cut waste by automating *your* process. Call your local Louis Allis District Office, or write to The Louis Allis Co., 432 E. Stewart St., Milwaukee 1, Wis.

*Dynapar Corporation is the electronic subsidiary of The Louis Allis Co.

MANUFACTURER OF ELECTRIC MOTORS AND ADJUSTABLE SPEED DRIVES

LOUIS ALLIS

For more facts Circle 489 on Reader Service Card

EFFICIENT REMOVAL OF DUST AND CHIPS

• SNAGGING • GRINDING • CHIPPING
• MACHINING • BUFFING • POLISHING
and similar operations

Whatever your problem in industrial dust control, call on Kirk & Blum, an organization of engineers and mechanics with more than 50 years' experience in this specialized field.

You secure a complete service from Kirk & Blum . . . DESIGN, FABRICATION and INSTALLATION . . . with a single responsibility for an *efficient* dust control system.

For an analysis of your dust control problem, call on Kirk & Blum's expert engineering service. Write today for complete information and a K & B survey.

The Kirk & Blum Manufacturing Co.,
3209 Forrer Street, Cincinnati 9, Ohio

KIRK & BLUM
DUST CONTROL SYSTEMS

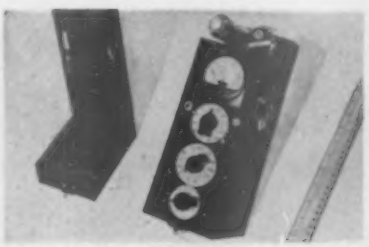
Begins on page 156

EQUIPMENT NEWS

For more data, circle item numbers you want on Reader Service Card.

144—Portable airless spray, for all 5-gal. paint containers, applies finish with pinpoint accuracy. Minimizes fog, overspray, and bounceback, thus reducing time and material. Good for short-run production finishing, maintenance. Uses 1½-hp. compressor. *Aro Equipment Corp.*

145 — Dehumidifier automatically handles 3000-cu.-ft. air flow per minute and removes up to 75 lb. of water per hour. Packaged ready to plug in. Few moving parts, thermostatically protected heaters assure long life, trouble-free operation. *Universal Dynamics Corp.*



146—Pocket-size sound analyzer (4 lb.) gives octave band readings, overall sound levels, or A, B and C scale readings by setting two switches. One-meter reading—no computation. Comes with built-in battery check, electrical and acoustical calibrator. *Industrial Acoustics.*

Turn the page

R-W PRODUCTIVITY METHODS ANALYZATION PROGRAM

...what it is and what it can mean to your overall cost reduction efforts

American Industry, caught between high taxes, increased manufacturing costs and unrealistic selling prices due to keen competition, is experiencing a tight "profit-squeeze." Because of this, industry's prime goal for the 60's is the achievement of substantial manufacturing cost-reductions. A substantial reduction in manufacturing costs can provide greater year-end profits than would a hard-to-achieve 20% increase in sales . . . and at far less cost. The basic problem is to achieve greater output with the same or even less expense.

We at R-W, as manufacturers of products for industry, have always endeavored to serve industry over and above the sale of our equipment. This service plus our inherent interest in a sound and profitable future for American Industry has motivated the development of our "R-W PRODUCTIVITY METHODS ANALYZATION PROGRAM."

This program provides a method whereby an R-W Applications-Engineer will work directly with your production or cost-reduction committees to analyze problems in your manufacturing and make recommendations as to how these problems could be solved through the improved use of materials handling equipment. Past experience has proven that materials handling offers industry its greatest cost-cutting frontier and the quickest way to achieve major cost-reductions is through proper conveyorization.

This program also provides a method to determine the *true cost* of new equipment. Keep in mind *true cost* is based on the cost-saving productivity of new equipment.

You are cordially invited to take advantage of the R-W PRODUCTIVITY METHODS ANALYZATION PROGRAM, it could help reduce your overall manufacturing costs tremendously . . . and, all it costs is a little of your time.

Sincerely,

Gordon S. Culver
President

Your local R-W Application Engineer would appreciate the opportunity of discussing this program with you . . . write for details and a copy of the R-W "Cost Reduction Check List."

RICHARDS-WILCOX MFG. CO.
MATERIALS HANDLING DIVISION
410 W. THIRD ST. • AURORA, ILLINOIS

For more facts Circle 491 on Reader Service Card

FOR LOW-COST, DEPENDABLE FIRE DETECTION ALARM!

Kidde Atmo fire detector tubing

KIDDE ATMO: Ideal for schools, hospitals, plants, public buildings, Kidde Atmo Fire Detecting and Alarm Systems use highly sensitive rate-of-temperature-rise detection tubing. Easy to install, simple to maintain, Atmo systems give fast warning in first stages of fire.

Kidde Fyrindex detection element

KIDDE FYRINDEX: Now — dependable fire detection at the lowest possible cost. Kidde Fyrindex features fast-acting, self-resetting detectors, comes in either rate-of-rise, fixed temperature or combination models.

Both Kidde systems are U.L. and F.M. approved; sound alarms locally, at central station, or at municipal fire headquarters; feature one to one hundred zone control and annunciator panels.

For complete information about Kidde fire detection, write today.

Kidde

Kidde Ultrasonic & Detection Alarms Div.
1132 Brighton Road, Clifton, New Jersey
Walter Kidde & Company, Inc., Belleville 9, N. J.

For more facts Circle 492 on Reader Service Card

Begins on page 156

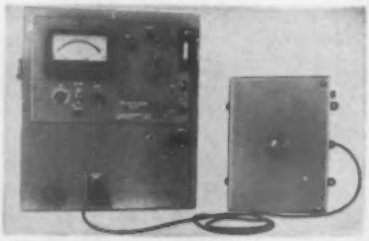
EQUIPMENT NEWS

For more data, circle item numbers you want on Reader Service Card.

147—Portable spray gun deposits electrically-charged particles evenly on any object within influence of field. No coating wasted. Handles plastic or enamel powders. Noise-free operation. Uses 100-watts power. No skill to operate. Stajet has anti-sparking head. *Sames.*

148—Ultrasonic generators, 2 and 3 kw., weigh 20 to 40 lb. Tubeless—need less space; roll-around cabinet. Built-in—no d-c voltage above 100 or a-c voltage above 1000. Single phase, 60 cycle, 110 or 220 v. Efficiency is 60 to 70%. *Westinghouse Electric Corp.*

149—Air pump handles high volume of light-and-heavy-viscosity corrosive fluid. Stainless steel Pogo pumps from 55 gal. open-top containers. Comes with clamp or cover mounting. Delivers 1.75 gal./min. continuous duty; 2.5 gal./min. maximum. Rugged. *Binks Mfg. Co.*



150—Carbon monoxide analyzer reads percentage in seconds using infra-red absorption. Extremely sensitive; has switch-selected ranges of 0 to 0.5% and 0.03 to 0.25%. Compact (18x19x10 in.), it weighs 60 lb. For intermittent or continuous testing. *Gelman Instrument Co.*

Turn the page

Mahon means varied Building Products—engineered for today's industrial construction
Mahon means all types of structural steel fabrication and erection
Mahon means Process Equipment—designed, built and installed
Mahon means the best in finishing—from spray booths to complete systems
Mahon means Steel-Weld fabrication—with a faculty and facilities for tough jobs

MAHON MEANS MANY THINGS

. . . but most of all—a diversified, growing company meshed to the needs of modern industry . . . supplying engineered components, equipment and services for construction, processing and product finishing. Mahon is unique . . . and provides unique one-source benefits.

The present scope of Mahon has been developed on a multiple-activity base with a singleness of purpose—*a business to serve your business.* Whether you're building a new plant, designing a heavy-construction project, modernizing facilities, evaluating new finishing methods, looking for improved process techniques or the right steel-fabricating source—Mahon offers an industrial 'package' that contributes to your growth, profit and progress. Investigate the products, services, resources, capabilities *and advantages* of Mahon.

MAHON

THE R. C. MAHON COMPANY DETROIT 34, MICHIGAN

MANUFACTURING PLANTS—Detroit, Michigan and Torrance, Calif.
SALES-ENGINEERING OFFICES—Detroit, New York, Chicago, Cleveland, San Francisco and Torrance, Calif., and E. Orange, N. J.
REPRESENTATIVES—in all other principal cities.

Snap-on

MIDGET TOOLS

speed assembly of tiny components

159-TM-B Complete Midget Utility Set
¼-in. square drive — 59 tools in strong metal box

This SNAP-ON ¼-in. square drive set gives you a practical assortment of tools for small, intricate product assembly or maintenance work — electronic components, appliances, communication equipment, etc.

The 59-tool set includes deep hexagon and standard hexagon sockets ranging from ⅛ in. to ½ in.; square sockets; regular tip, Phillips, clutch-type and hex head screwdrivers; plus ratchets and a wide assortment of other handles and adaptors.

The fine quality and precision machining common to all SNAP-ON tools is particularly important in these tiny units. Socket openings, for example, are machined to extremely close tolerances to fit snugly and surely over tiny nuts and bolts without slipping. Driver bits likewise are machined to close tolerances and fit well into screw recesses to avoid gouging of screw heads.

The result is faster work output, far less rejects because of bolt or screw damage. And, because tough SNAP-ON tools last longer, they cost less in the long run.

SETS ASSEMBLED TO ORDER

The above set can be modified to meet your exact needs, or sets of specially selected Midget socket wrenches and other small tools can be developed to fit your exact requirements. Available, too, are Midget industrial sockets in black finish for use on power nut runners. Your SNAP-ON representative will be happy to give you full details. He offers a complete range of hand and bench tools for all industrial needs. Call your nearest branch or write us for new industrial catalog.

FOR ALL INDUSTRY

SNAP-ON TOOLS

8044-K 28th AVENUE • KENOSHA, WISCONSIN

Begins on page 156

EQUIPMENT NEWS

For more data, circle item numbers you want on Reader Service Card.

151—Bantam vibratory feeder, 3 in. diameter, 2⅜ in. high, handles small parts down to fine powders. May be built right into work station. Preloaded spring construction makes unit extremely rigid. No gravity chutes needed; plastic bowl has machined troughs. *Minimus Co.*

152—Circuit breakers (molded case), with 125 to 200 amp., 120/240 v. ratings, interrupt 10,000 amp. All are 7 in. high and 2 11/16 in. deep; two-pole are 3 in. wide. For use in individual enclosures, panels, load centers, panelboards. *Westinghouse Electric Corp.*

153—Mobile infra-red heat panels can be formed into any size paint-baking or curing-oven design. Hinged top section permits placing two units opposite one another to form oven of any size. Low cost. Come in 125 to 500 watts. Operate on 250 v. 3-phase. *Radcor, Inc.*

Turn to page 196

NEW
TWO-HIGH
SPACE MAKER
HIGH-VOLTAGE
CONTROLLER

SpaceMaker is an Allis-Chalmers trademark.

the only real drawout 2- to 5-kv controller...with a contactor you can get at, into, around...without tools

▲ This means no unbolting—no wires to unfasten. You rack the contactor to "disconnect position" with the door closed. Open door. Roll contactor carriage out. It's that simple, that quick . . . and safe. ● Inspection? Lift out arc chutes and barriers. Rotate pole pieces to fully expose contact structure. Fuses? Lift them out, too. No tools, all the way. ■ SPACEMAKER control. First dramatic new achievement in high-voltage motor control in more than a decade. To learn more about the many cost-cutting features, call your A-C distributor or representative. Or write Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wisconsin.

LET'S COMPARE THESE FEATURES

	SpaceMaker Controller	Controller "A"	Controller "B"
Two starters in 90" height	Yes	No	No
Drawout construction	Complete	Partial	No
Simultaneously disconnects all six main leads (line and load)	Yes	Line Only	Line Only
Automatic shutters isolate line	Yes	Yes	No
"No-tool" inspection of contacts	Yes	No	No
Track-resistant, flame-retardant insulation	Yes	No	No
Contactor construction	Double Break	Single Break	Single Break
Overload relays visible from outside	Yes	No	No

ALLIS-CHALMERS

A-C

A-1521

Vari-Tex speed changers: low maintenance costs

WHILE OTHER UNITS PRACTICALLY HAVE TO BE DISMANTLED FOR ROUTINE MAINTENANCE, Vari-Tex SPEED CHANGERS ARE DESIGNED FOR QUICK BELT CHANGES, EASY LUBRICATION.

Talk about easy maintenance—you can change a belt in minutes without removing discs or the adjusting mechanism. Lubrication is easier still. Just aim the grease gun and fire away.

Vari-Tex speed changers cost less to buy, to install, to operate . . . even to modify. And they save space, conserve input horsepower.

You can choose from a complete line up to 30 hp. *Vari-Tex* units provide an infinite number of ratios between standard speed ranges of 2 to 1 through 6 to 1.

For all the facts, see your A-C representative or nearest distributor. Or write Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wis.

Vari-Tex is an Allis-Chalmers trademark. A-1549

ALLIS-CHALMERS

MARMAN FLEXMASTER Pipe Joints Cut Replumbing Time 75%

Why use expensive threaders, cutters and heavy wrenches?

Breakdown and replumbing of a vital process water system threatened 75% of a west coast manufacturer's production. The plant engineer cut the time necessary for the job to 25% of that required by ordinary plumbing methods by using Marman FLEXMASTERS.

These versatile units joined pipe without flanging, threading or grooving in the restricted pump pit shown at right and one man did the job with an ordinary hand wrench. Because they allow 4° angular misalignment and accommodate axial pipe movement or length variation, proposed excavation of underground piping was avoided and plant downtime prevented through use of FLEXMASTERS.

Marman FLEXMASTERS are available in sizes from ⅜" to 4" O.D., with lengths to 36", including elbows, tees and crosses. Good for 150 lb. service with a 4:1 safety factor. Temperature range from −40 to +250° F.

Learn how the plant engineer saved his company thousands of dollars on just this one job. Send for FLEXMASTER Bulletin No. 805 and list of distributor locations with details explaining emergency problems encountered in modification of this pumping system. Just return coupon.

FLEXMASTER is an Aeroquip trademark.

Aeroquip

MARMAN DIVISION

11214 Exposition Blvd., Los Angeles, California

Aeroquip (Canada) Ltd., Toronto 19, Ontario

Aeroquip G. m. b. H. Baden-Baden-Oos, Germany

Marman Products are Covered by U.S. and Foreign Patents and other Patents Pending

MARMAN DIVISION, AEROQUIP CORPORATION
11214 Exposition Blvd., Los Angeles, California

Please send FLEXMASTER story.

Name_____

Title_____

Company_____

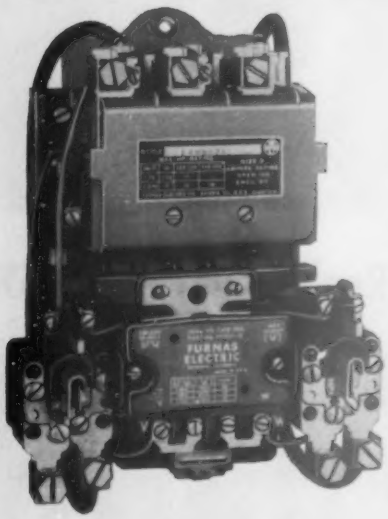
Address_____

City_____ Zone____ State_____

← For more facts Circle 496 on Reader Service Card

For more facts Circle 497 on Reader Service Card

NEW SIZE 3



1/3 SMALLER

The new compact Furnas Size 3 magnetic starters, 1/3 smaller than other Size 3 models, incorporate inherently trip-free melting alloy type thermal relays for greater motor protection, and a simplified, low wattage, electromagnet design. For 2, 3 and 4 pole, 30-50 hp.

- Features 1/3 more wiring room than other models.
- Contact assemblies readily accessible for routine inspection or servicing.
- Front removable parts.
- Mounting dimensions on open type identical to Sizes 2 and 2½.
- Pilot light, pushbutton, selector switch and third overload can be added in the field.

Write today for Bulletin 14-B3, 1032 McKee Street, Batavia, Illinois

A110

FURNAS ELECTRIC COMPANY • BATAVIA, ILLINOIS

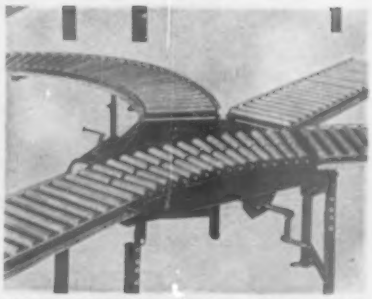
Sales Representatives in All Principal Cities

FURNAS

Begins on page 156

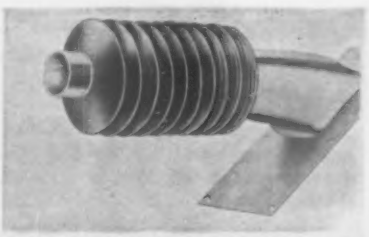
EQUIPMENT NEWS

For more data, circle item numbers you want on Reader Service Card.



154—Flexible roller conveyor units divert material from common carrier 45 degrees left or right, or straight through. Spur switch, for two or three-way traffic, connects to gravity or power conveyor. Curved units are for 12-, 18-, or 24-in. conveyors. *Rapids-Standard Co.*

155—Battery charger line, for 12- to 60-cell lead-acid batteries from 2 to 25 amp., costs up to 40% less than previous models. Use of miniature silicon cells, improved construction techniques, reduce size to 12x 18 sq. in., up to 38 in. high. *Fansteel Metallurgical Corp.*



156—Heat resistant sleeve can be used as duct for heat, and hot gas transfer between intake and exhaust of industrial furnaces. Made of pliable silicone-coated, glass fiber material. Resists ambient heat to 450 F. Also flexes without danger of cracking at —80 F. *A&A Mfg. Co.*

Turn the page

Now *this sander is second best...*

HERE IS THE NEW CHAMP

The old Aro 7025 Vertical Sander was industry's favorite for years. Nothing could touch it for speed, power, reliability.

That's all changed, now. The old 7025 has slipped to second best.

The new champ is the ALL-NEW ARO 7025 Vertical Sander. A completely re-designed job that brings you new Aro engineering advancements, new Aro concepts in lightweight, compact design.

Some of the advantages you can expect in the NEW Aro 7025 are . . .

- TWICE THE POWER
- DIRECT-DRIVE
- MORE SPEED
- LIGHT IN WEIGHT — 5 LBS.
- EASIER HANDLING
- NEW SAFETY GOVERNOR
- QUIET EXHAUST

ARO®

AIR TOOLS

THE ARO EQUIPMENT CORPORATION
INDUSTRIAL DIVISION · BRYAN, OHIO

Aro of California, 3141 S. Grand Ave., Los Angeles 7
Aro Equipment of Canada Ltd., Roxdale (Toronto) Ont.
Offices in Principal Cities

For more facts Circle 499 on Reader Service Card

KLIXON MOTOR CONTROLS COVER

ENTIRE SPECTRUM OF PROTECTION

This snap-acting on-winding protector (9850 type) is typical of the built-in protection KLIXON motor controls offer to prevent overheating and burnout for all types of AC motors. This precision-calibrated, miniature protector is attached directly to motor winding, and can be dipped and baked as part of it. Responsive to both current and temperature, it provides positive make and break action, vibration resistance, and the dependability of all KLIXON protectors.

Ranging from the simplest circuit breaker to complete motor protection . . . from the end-bell mounted, 3-phase protector (see photo below) to the on-winding 9850 type protector above, the KLIXON motor protector spectrum is the most comprehensive available to electric motor manufacturers and their customers. The spectrum brings KLIXON's wealth of application knowledge and manufacturing experience to the manufacturer . . . lets specific service conditions determine protection needs.

How KLIXON Motor Protector Spectrum Works:

As level of protection increases . . .

- Motor adaptability to a variety of applications increases.
- The protected motor is affected less by high or low ambient, or other external conditions.
- Reliability and accuracy increase.
- Overall application testing costs decrease.
- You get greater protection against motor failures due to failure of allied components.

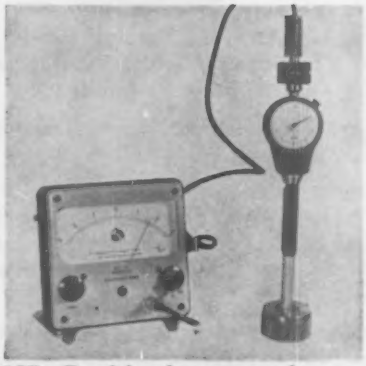
Find out how the KLIXON SPECTRUM OF MOTOR PROTECTION can save you money. Request complete Motor Controls catalog and location of nearest KLIXON field engineer by writing:

METALS & CONTROLS INC.
5810 FOREST STREET • ATTLEBORO, MASS.
A CORPORATE DIVISION OF
TEXAS INSTRUMENTS
INCORPORATED

Begins on page 156

EQUIPMENT NEWS

For more data, circle item numbers you want on Reader Service Card.



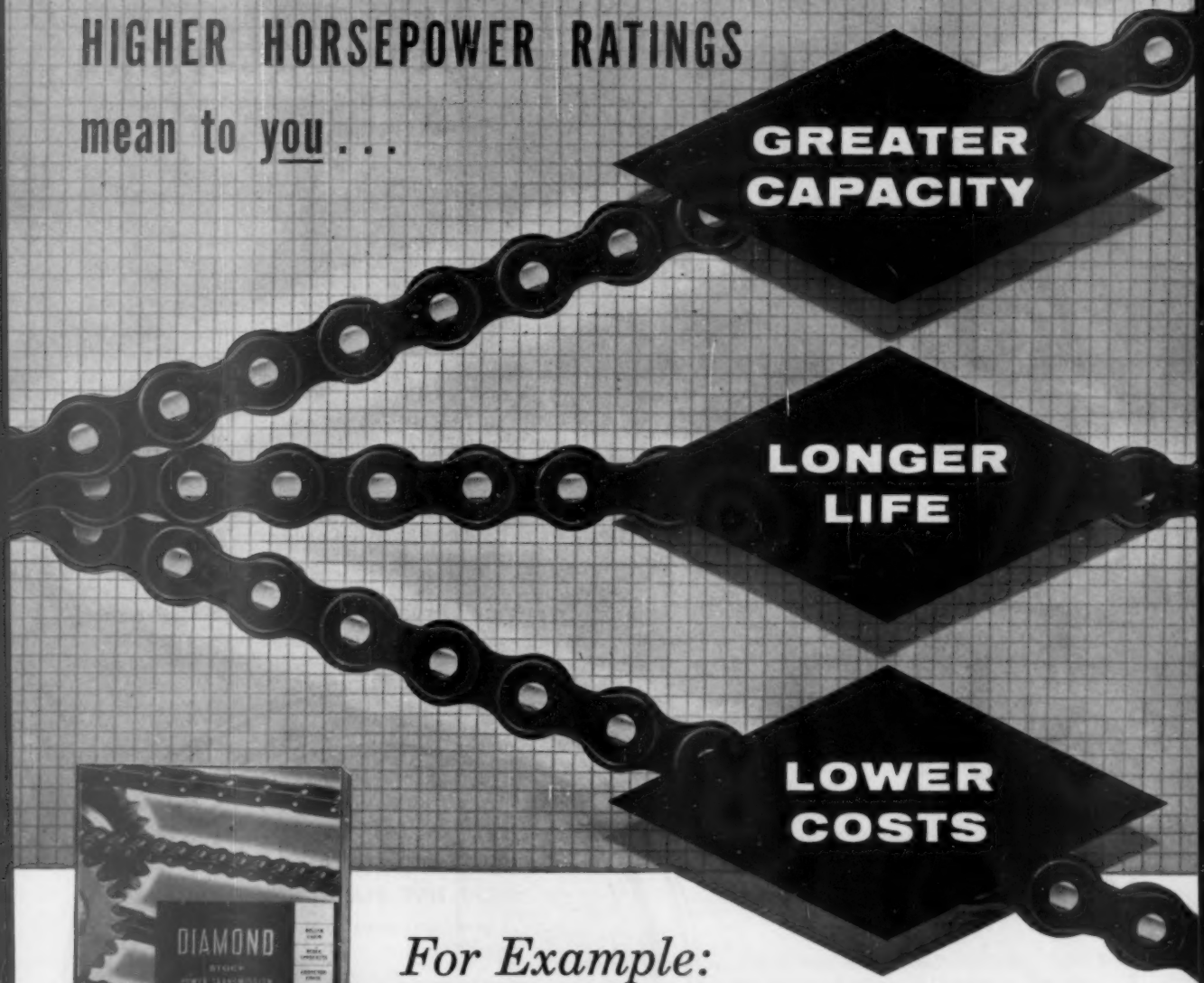
157—Precision bore gauge is combination gauge and electronic indicator that automatically becomes activated as finished size approaches. Extremely accurate, portable. For use in lapping, honing, and jig boring operations. Measures bores from ¼ in. up. *Boice Gages, Inc.*

158—Electric light dimmer operates both incandescent and rapid-start fluorescent lights on same circuit. Control switch fits any 2-in. box. Handles up to 600 watts of incandescent alone. "Tunes" light from full brightness to total darkness. *Harvey Hubbell, Inc.*

159—Lift truck mast, with 750-lb. capacity, reaches to 10 ft. 6 in. In 3 sections that telescope to 74 in., and reach maximum height in 15 sec. Tilts 10 degrees back and 2 forward. Truck goes up 16-degree incline with full load. For model S-10 Moto-Bug. *Kwik-Mix Co.*

Turn the page

Here's what DIAMOND Roller Chain's HIGHER HORSEPOWER RATINGS mean to you . . .



Write for New DIAMOND CATALOG No. 760

Just off the press. DIAMOND Stock Roller Chain, Sprocket, and Coupling Catalog No. 760 gives all the new horsepower ratings. Catalog 760 also contains full data on four important new DIAMOND Roller Chain Products: *Micropitch, Dura-Weld* and *Tuf-Flex* chains and *Hi-Cap* flexible couplings.

For Example:

Former ratings for 1 inch pitch roller chain permitted sprocket speeds up to 1160 RPM, whereas the *new* ratings include speeds up to 2800 RPM. Similarly, rated *horsepower* capacities formerly did not exceed 49 HP, whereas the new ratings exceed 150 HP. New, higher ratings mean that DIAMOND roller chains are capable of more work, will last longer (thus, cost less to operate) than heretofore considered practical. You now have more opportunities to specify high-efficiency DIAMOND Roller Chain drives . . . both in new equipment designs and in modifications of existing equipment. Write today for *new* DIAMOND Catalog No. 760. *It contains all the new ratings* as established by the Association of Roller and Silent Chain Manufacturers, of which DIAMOND is a charter member.

DIAMOND CHAIN COMPANY, INC.

A Subsidiary of American Steel Foundries

DEPT. 449 • 402 KENTUCKY AVE.

INDIANAPOLIS 7, INDIANA

Offices and Distributors in all Principal Cities

DIAMOND ROLLER CHAINS ®

For more facts Circle 501 on Reader Service Card

FLAME-RESISTANT

Arno® DUCTAPE

TRADEMARK

FOR DUCTS AND INSULATION

- ✓ Complies with all building codes for flame-resistant duct tapes.
- ✓ Self-adhesive . . . sticks to any duct material or insulation.
- ✓ Will not support flame . . . holds firmly at high temperatures.
- ✓ Nothing to mix . . . saves labor.
- ✓ Vaporproof . . . waterproof.
- ✓ Meets ASTM standards.

Write for FREE test sample!

ARNO ADHESIVE TAPES, INC.

Dr. Scholl's Adhesive Tape Division

5210 Ohio St., Michigan City, Ind.

For more facts Circle 502 on Reader Service Card

INDUSTRIAL FLOORING

Resurfacing and Patching Problems Solved, Get Flintkote Data Sheets

FOR NEW CONSTRUCTION AND RESURFACING: Cold-Laid Asphalt Mastic provides a non-slippery, dustless, insulating and comfortable, tough, shockproof wearing surface.

Flintkote Latex Flooring has high strength and toughness without brittleness. Unequaled in economical durability for topping worn floor surfaces. Trowel applied.

FOR SMALL PATCH WORK: Flintkote Latex Concrete Patch is a two component unit in a single package. Provides a tight, non-shrinking bond to virtually all surfaces. Trowel applied.

FOR PROBLEM FLOORS: Flintkote Epoxy Flooring has great resistance to solvents, oils, greases, acids, alkaline solutions, alcohols, shock and abrasive wear.

FLINTKOTE®

Write to: The Flintkote Company, Industrial Division, 30 Rockefeller Plaza, New York 20, N.Y.

America's Broadest Line of Building Products

For more facts Circle 503 on Reader Service Card

DeSoto Industrial Finishes

for every maintenance requirement

The systems listed are good reasons to call DeSoto. They are examples of the many customized finishes available for every maintenance requirement. More good reasons: You get free consultation with experienced DeSoto survey engineers.* They'll analyze your painting problem—then recommend the best coating at the lowest possible cost.

This start-to-finish solving of industrial maintenance problems makes DeSoto your best long-range and short-term buy. Service from DeSoto is like that. Write for details.

KOROPON EPOXY COATINGS
HICOR VINYL PLASTIC COATINGS
...give high corrosion and chemical resistance.
SYNTHEX ENAMEL SYSTEMS
...protect areas where mild corrosives are prevalent.
HEAT RESISTANT COATINGS
...withstand temperatures from 300° to 1200° F.

*PLANTS: Greensboro, N.C. Philadelphia, Pa. • Chicago Heights, Ill. • Chicago, Ill. Dallas, Tex. • Berkeley, Calif.

DeSoto Chemical Coatings, Inc.

1350 South Kostner Avenue, Chicago 23, Illinois

For more facts Circle 504 on Reader Service Card

Begins on page 156

EQUIPMENT NEWS

For more data, circle item numbers you want on Reader Service Card.

160—Liquid meter automates processing operations with press of button. Delivers preset quantity of liquid, then resets automatically to repeat. Starts or stops pumps, solenoid valves, signaling devices, relays. Connected in series; one meter actuates rest. *Buffalo Meter Co.*

161—Pipe fittings are chemically cleaned, coated with tin, and prefluxed before leaving plant, thus reducing maintenance and installation costs. Coating improves tensile strength. Can be stored indefinitely; rosin flux has long life span. Bronze or copper. *Nibco Inc.*

162—Chainless overhead conveyor system continuously pushes 4000-lb. capacity trolley-mounted carriers on paralleling monorail track. Pusher dog (on second track) manually disengages to allow switching of carriers to work stations on spur tracks. *American Monorail Co.*

Turn to page 204

New H-30B PAYLOADER®

25% greater capacity

Through Hough's continuing program of research, development and improvement, a new 4-wheel-drive PAYLOADER tractor-shovel (Model H-30B) has been developed that is an even better machine than the original model introduced 18 months ago. Here are several points of special interest:

More Capacity: Standard 1¼-cu. yd. bucket provides 25% more capacity without sacrificing the H-30's exceptional stability and balance. (Bucket sizes from ¾ to 2½-cu. yd., SAE rated.)

More Safety, Less Maintenance: The only loader in its class with boom arms positioned far ahead of operator. Simplified boom mechanism, with single cylinder bucket tilt, has 6 to 12 fewer pivot and grease points to maintain.

More Power: More hp per pound than comparable loaders. Torque converter properly proportions power between drive train and hydraulic needs. Choice of gas or diesel engine.

Better Braking: The only loader with sealed, 4-wheel hydraulic brakes and "operator's choice" dual brake pedals. Exclusive axle design permits servicing of brakes without removing and exposing planetary hubs to dust and dirt.

"Plus" Features: Full power-shift transmission with no stopping for range shifts; positive oil cooling with separate oil-to-air radiator; closed, pressure-controlled hydraulic system; power-transfer differentials for best possible traction under any condition; 3 forward and reverse speeds, up to 25 mph.

A Hough Distributor near you will gladly demonstrate these easy operating, high production elements of the H-30B. Call him today or write for more information.

HOUGH®

THE FRANK G. HOUGH CO.
755 Sunnyside Ave.
Libertyville, Ill.
SUBSIDIARY — INTERNATIONAL HARVESTER COMPANY

☐ Send complete data on H-30B PAYLOADER

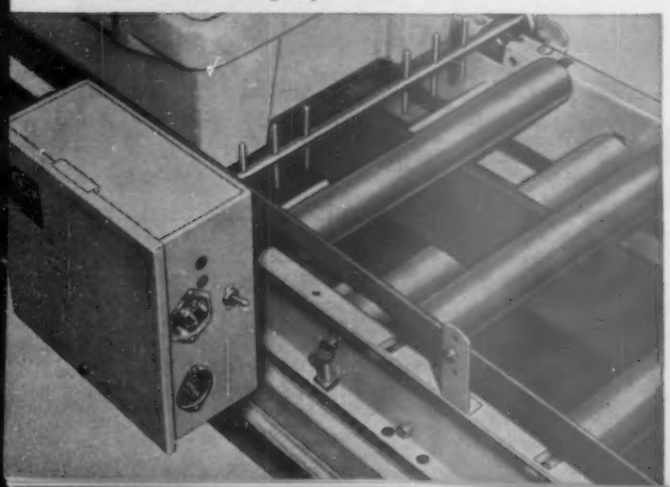
Name _____
Title _____
Company _____
Street _____
City _____ State _____

11-A-2

For more facts Circle 505 on Reader Service Card
Circle 506 on Reader Service Card for items on next page

"Skate wheel" diverters increase rate of flow and eliminate mechanical damage often caused by swinging metal arm diverters. Controller—designed with mechanical spring linkage to eliminate solenoid burnouts—may be mounted to either side of conveyor.

"Paddle wheel" tray stop eliminates pneumatic system and can be used as a spacer, counter or with a timer to release trays at programmed intervals. Paddle, spring-held to bottom of each passing tray, is operated by force of the moving tray.



Proximity type sensing heads, transistorized and plug-in, will read without failure at 5/8" to improve flow reliability. Passing reader cards disturb a field emitted by sensing head and produce output signals to control conveyor operation.

CONTROL

What's new in material handling control?

Make your conveyor system more efficient with these new diverters, proximity readers, stop-spacers.

These new Cutler-Hammer specialized components have been successfully applied in some of the most outstanding automated material handling systems in operation.

The "roller skate wheel" diverter, for example, can double conveyor capacity without increasing conveyor speed. By eliminating the space formerly required for swinging metal diverter arms, carrying capacity is increased . . . damage to tote pans from swinging diverters is eliminated.

Adding greatly increased flexibility, these new devices have proven their efficiency in the most demanding engineered systems. Now they're being made available to you for your special applications. Each of these components measures up to the same high quality standards you've gotten for so long from Cutler-Hammer limit switches, pushbuttons, motor starters and other control apparatus used on conveyor systems.

WHAT ELSE IS NEW AT CUTLER-HAMMER?

These new conveyor control devices are typical of the many improvements coming out of Cutler-Hammer's systems engineering experience. As new problems are tackled, new ideas for solutions mean more and more improved new products are developed. Why don't you call your Cutler-Hammer sales office soon for new ideas that can help you solve your material handling problems?

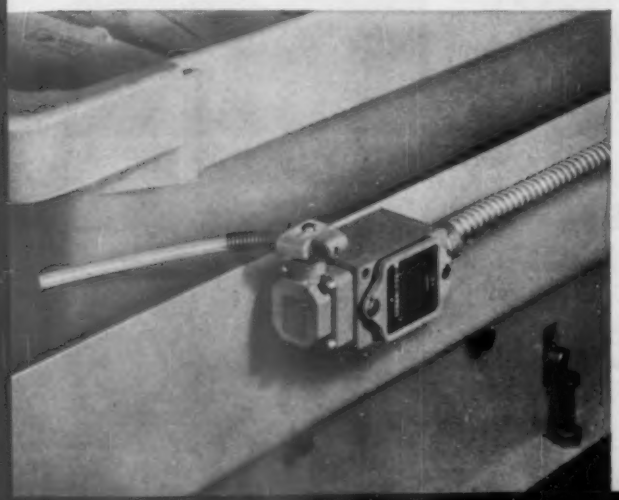
WHAT'S NEW? ASK . . .

CUTLER-HAMMER

CONTROL

Cutler-Hammer Inc., Milwaukee, Wisconsin • Division: Airborne Instruments Laboratory • Subsidiary: Cutler-Hammer International, C. A. • Associates: Cutler-Hammer Canada, Ltd.; Cutler-Hammer Mexicana, S. A.

Limit switches. Many operator options to fit your particular need. New spring mounted nylon operator can be mounted on side of conveyor and is actuated by passing trays. Special design is tamper proof and eliminates multiple counts.

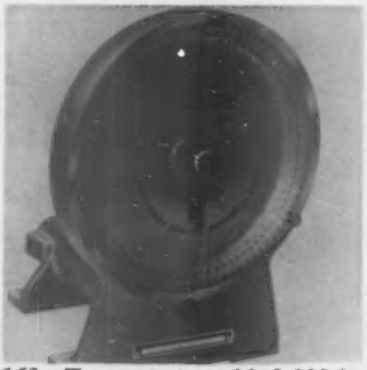


Graphic control consoles can be engineered to fit your application. This one is main console for a 6,000 ft. order-picking system. Anodized aluminum conveyor layout has control switches mounted to facilitate manual or semi-automatic operation.

Begins on page 156

EQUIPMENT NEWS

For more data, circle item numbers you want on Reader Service Card.

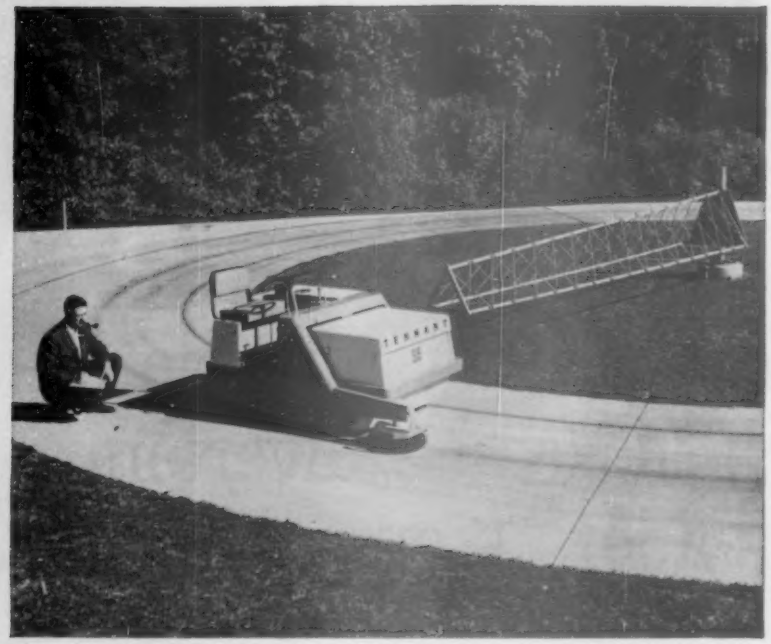


163—Torque tester, with 0-800 in. oz. and 0-1000 ft. lb. ranges, checks accuracy of hand-operated wrenches or screwdrivers. Works counter- and clockwise. No need for level mounting. Indicator locks at reading until reset to zero. Weighs only 15 lb. *B. K. Sweeney Mfg. Co.*

164—Speaker phone, with mike in base, picks up conversation from anywhere in normal size room. Permits conference with all seated comfortably. Special circuit reduces mike-speaker feedback. For private and non-Bell System circuits. Easy to install. *Automatic Electric Co.*

165—Swivel chair for production workers combines comfort, low cost, long wear. Of molded plywood, seat adjusts for height; coil-spring supported back adjusts in and out. No welds to break or screws to loosen. $13.50; guaranteed 5 years. *Fabricated Metals Specialties.*

Turn the page



NEW TENNANT 85 SWEEPER gets performance check on non-stop sweeping endurance test

It takes a tough Tennant to ride this merry-go-round

Circling its test track day after day, this new TENNANT 85 Sweeper is confirming field results—that this is one of the *huskiest, most dependable sweepers available to industry.*

Such tests help explain why TENNANT is chosen world-wide for more critical sweeping jobs, we believe, than any other sweeper on the market.

Riding 15° (27%) rumps is another of the many tough tests that are standard for this unit. It sweeps a 53″ path as ultra-clean on grades as on the level.

Picks up on the run. Removes litter, dirt and debris . . . everything from cans and pop bottles down to fine dust. Even draws dirt from many cracks, crevices.

Extra rugged components are given brutal tests—such as the 30,000 start-stops of the sweeper's powerful fan . . . equal to 20 years of normal operation!

Built for tough jobs, the TENNANT 85 is expressly *engineered to far higher performance standards* than is common.

Perhaps this is why a TENNANT often lasts 3 times longer than similar machines on the same sweeping job.

May we prove this to you?

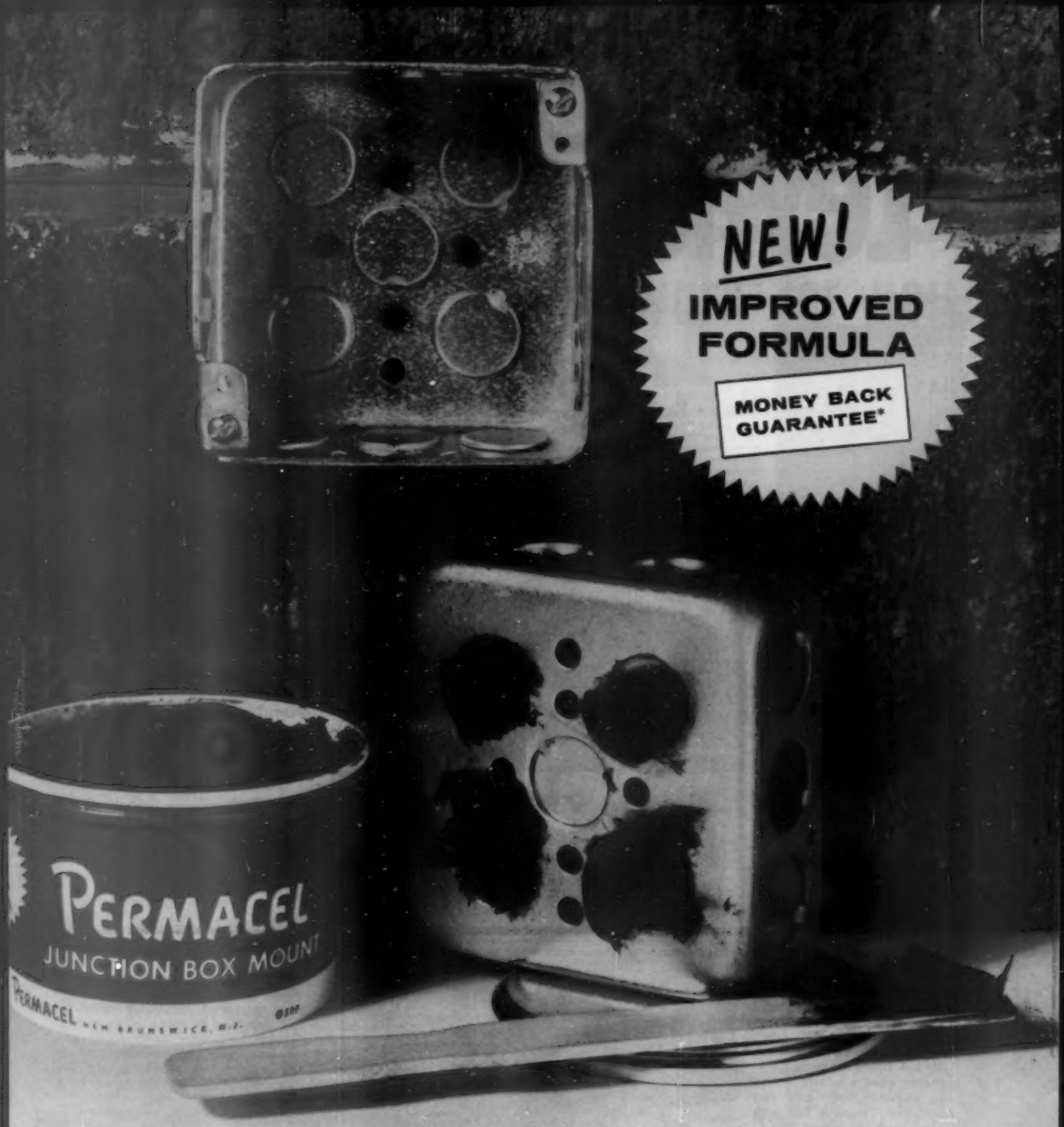
SWEEPING 24 HOURS PER DAY, this new Tennant 88 Industrial Sweeper cleans a 53″ path near potline in aluminum reduction plant. Machine has special abrasive dust protective features.

NEW BULLETINS give full details on the heavy-duty "85" and "88" Sweepers. Full of facts, photos showing why they stand up under round-the-clock work. Write today to G. H. Tennant Co., 705M North Lilac Drive, Minneapolis 22, Minnesota.

TENNANT

HEAVY-DUTY POWER SWEEPERS

INDUSTRY'S MOST COMPLETE FLOOR MAINTENANCE SYSTEMS



NO BOLTS, NO SCREWS, NO DRILLING

with **NEW** Permacel Junction Box Mount epoxy adhesive
. . . the fast, easy way to attach junction boxes to any surface.

* Guaranteed for a period of one year from date of purchase not to harden in the cup until mixed or until divider section is removed.

PERMACEL®

NEW BRUNSWICK, NEW JERSEY • TAPES • ELECTRICAL INSULATING MATERIALS • ADHESIVES

Lewis

Lewis

Lev

PATENTED
2,623,828
2,623,829

Stack-n-Nest® tote pans are a one-piece fiberglass molding . . . lightweight, strong, non-rusting, non-denting. Nine **job-proven** sizes, three molded-in colors, many time-saving accessories, and shipment within 24-hours from receipt of order. Plan now towards a dollar-saving Lewis container system by writing for complete details.

Lewis

G. R. LEWIS COMPANY • 1211 Montgomery St. • Watertown, Wisconsin

For more facts Circle 509 on Reader Service Card

FREE CATALOG shows complete line of low cost water and steam

HUMIDITY CONTROL UNITS

Informative FREE catalog describes, illustrates 14 unit humidifiers with low first cost, low operating cost. Water and steam units have automatic controls and come in various sizes and capacities suitable for any size area or plant need. Self contained humidifiers are installed easily from ceilings or on walls.

Send for your free copy today. Use handy coupon.

FA-1-N

THE BAHNSON COMPANY
Winston-Salem, N. C.
Please send your illustrated Catalog 104:

NAME_____

FIRM_____

ADDRESS_____

CITY_____ STATE_____

THE BAHNSON COMPANY • WINSTON-SALEM, N. C.

For more facts Circle 510 on Reader Service Card

Raw stock is delivered to operator via monorail. Previously, operator rolled coil down aisles and lifted it onto machine. This resulted in slow production and high accident rate.

Untangle Plant Traffic With Monorail

Clear the aisles for production . . . use monorail for materials handling. Suspended from the ceiling, a Louden Monorail Handling System removes traffic from the floor, saves floors for production. Not only does this untangle plant traffic, but also increases plant capacity and becomes a big factor in cutting cost of floor maintenance.

A Louden Monorail Handling System moves raw stock, semi-finished and finished products over the heads of men and machines, and its exceptional flexibility makes it ideal for all types of handling requirements. It can transport materials from point to point anywhere in your plant, either piloted by an operator or completely unattended. Materials can travel from floor to floor, building to building, opening and closing doors, pass through one processing stage after another, and even load and unload its own carriers with certain classes of materials.

When you have material handling requirements, call on Louden, the pioneer of monorail handling. Benefit by Louden's unequalled experience and broad array of service-proven equipment. Most Louden installations pay for themselves in months; some have done so in a matter of weeks.

Write today for "COST-CUTTING WITH MONORAIL AND CRANES" . . . 52 pages of illustrated applications, industry by industry.

Louden

MONORAIL & CRANES

THE LOUDEN MACHINERY COMPANY
1115 Broadway, Fairfield, Iowa

A Subsidiary of Mechanical Handling Systems Inc.

Plants in Fairfield, Iowa and Clark, New Jersey

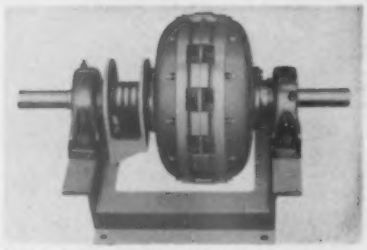
SINCE 1867 . . . THE FIRST NAME IN MATERIALS HANDLING

For more facts Circle 511 on Reader Service Card

Begins on page 156

EQUIPMENT NEWS

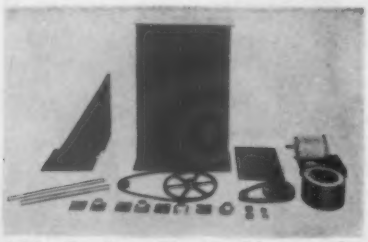
For more data, circle item numbers you want on Reader Service Card.



166—Hysteresis clutch electromechanically controls torque from 0 to full speed. Can slip at predetermined load for indefinite periods while holding driven load at desired torque. Torque is pre-set by varying d-c excitation. Rated to 10 hp., 1800 rpm. *Scanner Corp.*

167—Proximity switch reacts to all metals including aluminum cans, foil-wrapped packages, foil labels. Has 50% greater "reach" than previous metal-sensing controls. Operates over wide temperature range to 140 F. Transistorized for little maintenance, long life. *Peco Corp.*

168—Amplifier-control uses true proportional power magnetic amplifier. Linear change in input produces percentage change in process power. Permits control from any 0-5 ma. a-c signal. Single phase, 110 v. All five circuit panels removable. *Hevi-Duty Electric Co.*



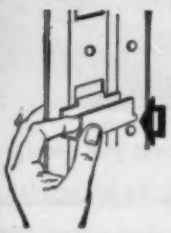
169—Bucket elevator kit contains do-it-yourself pre-engineered parts (from stock) for quick field assembly of bucket elevators for lifting bulk materials. Optional accessories: mid-sections for increasing elevator lift, bag and drum loading hopper. *Bucket Elevator Co.*

Turn the page

PUT BORROUGHS STEEL SHELVING to work for you!

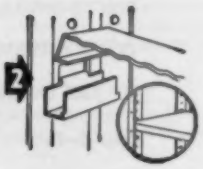
ALL the talk in the world can't prove the advantages of Borroughs Steel Shelving as quickly and convincingly as an actual test. You must see Borroughs' fast, simple assembly without special tools — Borroughs' easy shelf adjustability without nuts or bolts — Borroughs' rugged construction with specially formed posts — to get first hand evidence of Borroughs superiority. When you put Borroughs Steel Shelving to work for you, your particular storage problem will come to a happy end, whether it be materials to be stored or areas to be utilized. In Borroughs' open or closed steel shelving you get the most simple, most flexible, most rapidly assembled shelving on the market— with every unit complete in itself — and in a choice of heights, widths and depths that assures you utmost efficiency and economy.

this feature alone should swing you to Borroughs!



Insert 4 shelf support brackets with finger-tip ease — no fumbling with studs, bolts, nuts or lock washers.

Tilt shelf into support brackets with the greatest of ease—shelf is ready for loading.



send for catalog

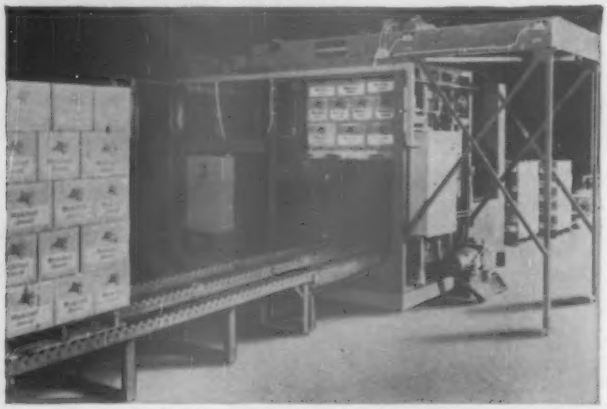
Represented in Sweet's Catalog, Plant Engineering File 4G BO

BORROUGHS MANUFACTURING COMPANY
OF KALAMAZOO
A SUBSIDIARY OF THE AMERICAN METAL PRODUCTS COMPANY OF DETROIT
3020 NORTH BURDICK ST. amp KALAMAZOO, MICHIGAN

For more facts Circle 512 on Reader Service Card

MATHEWS
PALLET LOADERS
that are delivering outstanding performance in the food and chemical industries

The machines shown here are two of a complete line of Mathews Automatic and Semi-Automatic Pallet Loaders.



Whatever your package handling problem, Mathews will build the equipment to do the job best for you. You'll get a complete conveyer engineering service, from proposal through installation, and equipment that will deliver outstanding performance. That is why we believe you get the most for your money when you buy Mathews Conveyers.

Send for Bulletin APL-60 for more pallet loader information

MATHEWS CONVEYER COMPANY
MAIN OFFICE AND EASTERN FACTORY — ELLWOOD CITY, PA.
WESTERN DIVISION
MATHEWS CONVEYER COMPANY WEST COAST
OFFICES—SAN CARLOS, CALIF. — FACTORY—CHICO, CALIF.
CANADIAN DIVISION
MATHEWS CONVEYER COMPANY, LTD.
OFFICES AND FACTORY—PORT HOPE, ONTARIO

MATHEWS

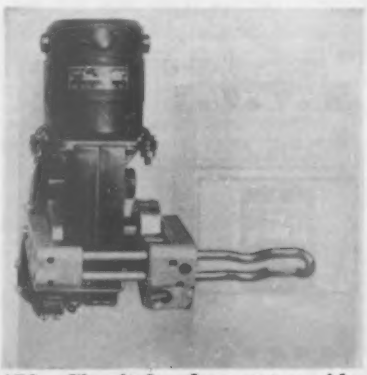
Begins on page 156

EQUIPMENT NEWS

For more data, circle item numbers you want on Reader Service Card.

170—Motor protector for installation in end windings, stator slots, or bearings, provides built-in protection against overheating. Allows use of motor service factor to maximum; eliminates most auxiliary relays. For integral motors to 200 hp. *General Electric Co.*

171—Air washer of rigid polyvinyl chloride won't rot, rust, corrode, or support combustion. Requires little maintenance. Uses steel in base and exterior framework only. Removes dust, dirt, contaminants; cools and humidifies at over 95% efficiency. *S & C Mfg. Co.*

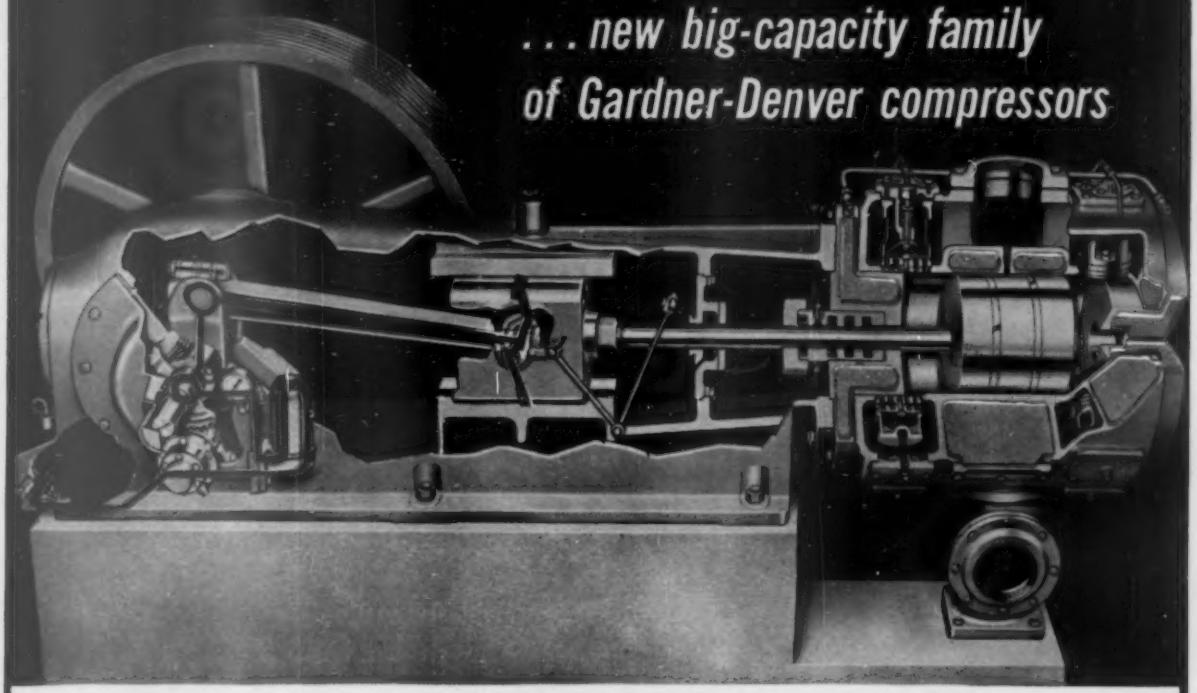


172—Circuit breaker motor, side-mounted, actuates all molded-case breakers from 100 to 1000 amp. Assures positive trip in both directions with complete safety for breaker and motor. Variable friction drive; under 5 in. high; 120 and 240 volt. *Lake Shore Electric Corp.*

Turn the page

MORE AIR POWER PER SQUARE FOOT OF FLOOR SPACE

. . . new big-capacity family of Gardner-Denver compressors

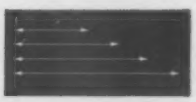


Pressure lubrication

New pressure system thoroughly lubricates bearings and moving parts in power end. System includes extra capacity oil sump, strainer, oil pump, oil filter and oil passages to all bearings.

Greater cooling capacity

Large water passages through the cylinder head and jacket efficiently cool the greater volume of compressed air delivered by Gardner-Denver RL compressors.



Four basic sizes with 5", 7", 9" and 11" stroke power frames, fill a wide range of capacity and pressure requirements... from 20 to 150 hp. All compressor sizes are available with oil-free construction.

Single stage RL horizontal models displace 108 to 1592 cfm, with pressures ranging from 20 to 150 psi.

RLT two-stage tandem compressors provide higher pressures up to 500 psi, with displacements ranging from 94 to 504 cfm.

RLV vacuum pumps give from 267 to 1383 cfm displacement; provide vacuum service to 29.8 in. Hg.

***New bulletins** describe in detail this fine new family of big-capacity Gardner-Denver RL compressors. Write for your copies now.*

EQUIPMENT TODAY FOR THE CHALLENGE OF TOMORROW

GARDNER-DENVER

Gardner-Denver Company, Quincy, Illinois—Offices in principal U.S., Canadian and Mexican cities
In Canada: Gardner-Denver Company (Canada), Ltd., 14 Curity Ave., Toronto 16, Ontario
International: Gardner-Denver International Division, 233 Broadway, New York 7, N. Y.

International Offices: Buenos Aires, Argentina; Artarmon, N.S.W. Australia; Brussels, Belgium; Rio de Janeiro, Brazil; Santiago, Chile; Barranquilla, Colombia; Lima, Peru; Ndola, N. Rhodesia; Salisbury, S. Rhodesia; Johannesburg, Transvaal

For more facts Circle 514 on Reader Service Card

Plant B.O. bother your neighbors?

Nothing will rouse the neighbors faster than plant odors.

If your present processes dump an odor problem onto your neighbors you may be building a public relations crisis – and you may also be throwing away valuable and recoverable solvents.

Activated carbon is a nearly universal adsorbent of odors and vapor contaminants. With activated carbon in your exhaust air system you can recover and re-use valuable solvents now being blown away. You can also recirculate the purified air and save substantially on plant heating or cooling costs. It's a good way to make your neighbors happy, too.

Give us the details of your application and we will supply specific data and samples – or write for Literature Group T-381.

Barnebey-Cheney, Columbus 19, Ohio

activated charcoal air purification

Barnebey Cheney

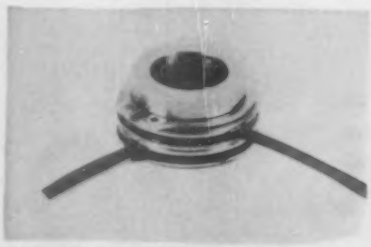
Begins on page 156

EQUIPMENT NEWS

For more data, circle item numbers you want on Reader Service Card.

173—Pipe coupler joins metal or plastic tubing and fittings with one low-cost tool. Connector piece aligns pipe ends. Gasket, in contact with fluid, can be corrosion-proof. Leakproof; unrestricted flow. Disassembles with wrench. In ½- to 6-in. sizes. *Cooper Alloy Corp.*

174—Safety transformer isolates tool from line to prevent defective portable tools or lights from causing shock hazard. Encapsulated core and coil is water- and shockproof. Single phase, 1 to 5 kva., up to 600 v.; 15-amp. model weighs 37 lb. *Westinghouse Electric Corp.*



175—Strain gauge-washer is temperature-compensated (over 50 to 250 F. range) to show strain from mechanical loading of bolts in structures, engine heads, etc. Priced at $70 to $100 for 3/16- to 1-in.-dia. sizes for 5000 to 35,000 lb. loads. *Lockheed Electronics Co.*

FACTORY

For more facts Circle 515 on Reader Service Card

USE THESE IDEAS...

TO GET UP TO AN EXTRA 4% NET PROFIT

Out of the Texaco man's briefcase comes a wealth of ideas for cost control through organized lubrication—Texaco's "Stop Loss" Program. Managers in many industries are already using these plans to reduce losses in three important areas: production, maintenance and purchasing. Their savings go directly into profits—the average is a 4% gain in their net. Get the facts. Write for our informative folder: "How to Starve a Scrap Pile." **TEXACO** INC., 135 East 42nd Street, New York 17, N. Y. Dept. F-192

TEXACO

Select ROLLWAY®... *it's your one best way!*

Rollway's 400 Distributors are carefully stocked and located to give you off-the-shelf service. Or, where distance requires, to ship by overnight truck, train or plane.

Rollway Solid-Cylindrical Roller Bearings are the made-to-order solution for replacement bearing problems. Engineered for specific service in a wider range of applications, the Rollway line offers a single source for light - or - heavy - duty precision radial and thrust bearings . . . for economical, utility-type Tru-Rols® . . . for low-cost inch and metric steel cage assemblies.

In application after application, field experience proves that actual service-life of Rollway Bearings clusters near the far end of the expectancy tables. You not only get replacements *faster* . . . you get replacements that *last longer!*

- **Ask your Distributor for a complete product line bulletin. Or write direct to Rollway Bearing Company, Inc., Syracuse, N. Y.**

You can depend on

ROLLWAY®
BEARINGS

ENGINEERING OFFICES: Syracuse • Boston • Chicago • Detroit • Toronto • Pittsburgh • Cleveland • Seattle • Houston • Philadelphia • LosAngeles • SanFrancisco

For more facts Circle No. 516 on Reader Service Card

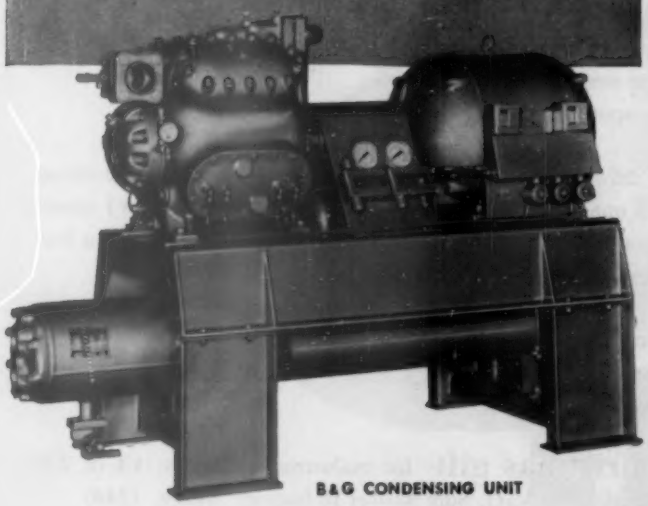
Final factory check-out. These cooling units will be shipped with everything mechanically correct and in accordance with the requirements of the order.

For cooling in shops and offices... or process work

M-PAK*

units most efficiently solve the problem...

*MODULAR PACKAGES



B&G CONDENSING UNIT

Summer cooling in shops and offices has long since proved its value as a stimulant to increased worker morale and productiveness. B&G Modular Packages (M-Pak units) now make it possible to provide it more economically and dependably.

Here is a new advance in efficiency designing of air conditioning and refrigeration equipment. M-Pak units are built around five basic sizes of *open-type* compressors. Factory-stocked motors, condensers, evaporators and controls can be added to these basic units to make a comprehensive line of immediately available cooling "packages" of from 7½ to 150 tons.

B&G builds "open-type" compressors because they offer many exclusive and outstanding advantages...no danger of motor trouble causing system contamination with consequent excessive down-time.

All major components of M-Pak units are designed, manufactured and guaranteed by B&G... *one* responsibility for the entire package.

BELL & GOSSETT COMPANY

Dept. GW-13, Morton Grove, Illinois

Canadian Licensee: S. A. Armstrong, Ltd., 1400 O'Connor Drive, Toronto 16, Ontario

Send today for complete information on Bell & Gossett M-Pak Air Conditioning and Refrigeration Units.

IDEAS OF THE MONTH

By Lewis K. Urquhart, Consulting Editor, FACTORY

For more data, circle item numbers on Reader Service Card next to back cover.

For frigid work areas portable oil-fired space heater (*Thor*) atomizes fuel centrifugally. No odor, no smoke, no build-up of fumes. Also no nozzles, no burner tips, so maintenance is kept to minimum. Heater weighs only 42 lb. without fuel. Will operate 13 hours continuously. **(236)**

Dollar-bill changer (*AC Automatic Services*) is what you need to make your automatic (vending machine) cafeteria really automatic. It rejects counterfeit money, foreign currencies. Has $150 change reserve. **(237)**

How to Reduce Indirect Costs is neat 8-pager (*Maynard*) that's sure to interest anyone looking for help in improving profits. **(238)**

Porta-Dolly is handy-dandy floor truck (*Market Forge*) with adjustable bar and safety clips that hang onto any container from 10 to 20 in. in diameter. Nothing better for moving mop buckets, trash cans, what-have-you. **(239)**

Booklet of the Month? Our choice is "Adjustable-Speed Drives" (*General Electric*). How to analyze. How to compare. How to select. Profusely illustrated 32-page brochure points out many ways to boost quality and production, includes recommendations for special applications. "Best discussion of adjustable-speed drives in print," says our Electrical Editor Jerry Quinn. **(240)**

With the federals breathing down the necks of expense accounters, your accounting folks might be interested in pocket-size weekly and monthly expense records (*Ideal System*) for convenient on-the-spot recording. **(241)**

Garnisheed! tells employees what they need to know about the flourishing garnishee racket. It's one of 19 Better Business Bureau booklets (*BNA*) aimed at helping workers get 100 cents for every wage dollar they spend. Want a free sample? And complete list of booklets available at low bulk rate? **(242)**

Three-digit numbers in new classification system (*Copper & Brass Research Association*) replace confusing trade names for brass and wrought copper metals; make identification doubly sure. **(243)**

Suggested Christmas gift for maintenance friends: kit of 250 self-locking nuts (*Elastic Stop Nut*). Sure answer to fastener failure. **(244)**

Ready for winter? Not until you've laid in supply of Flex Melt (*Flexrock*), those heat-generating pellets that (so they say) have 30 times the thawing power of salt, 10 times that of flake calcium chloride. **(245)**

Turn the page

GET THE NEWS BEHIND THE VIEW IN BERKSHIRE COUNTY, MASS.

Industrial site plans, transportation, civic improvement programs, fluctuations in the labor market . . . new developments every day build the lure of the Berkshires. Get an up-to-date file on present industry, plant sites and business climate . . . and regular bulletins on the changing Berkshire plant location picture. Write:

BERKSHIRE COUNTY INDUSTRIAL DEVELOPMENT COMMISSION / COURT HOUSE / PITTSFIELD, MASSACHUSETTS

ALL INQUIRIES HANDLED IN STRICT CONFIDENCE

For more facts Circle 518 on Reader Service Card

For more data, circle item numbers on Reader Service Card next to back cover.

For lift trucks, Tuf-flex. Polyurethane press-on tires (*CheMechanical*) have unusual traction, cushioning, abrasion-resistant qualities. Won't mark floors. Won't soften in oil, degreasing compounds, gasoline, etc. **(246)**

Emergency exit light (*Electric Cord*) contains normal circuit to operate on 115-volt a-c, secondary circuit with self-charging wet battery. When current fails, relays close and battery circuit is activated. **(247)**

Avistrap has been on the market a year. If you haven't already caught up with this super-strength rayon packaging material (*American Viscose*), new brochure gives widths, lengths, weights per coil of seven types of cord strapping. Also seals, tensioners, sealers, accessories. **(248)**

Snow-thrower attachment for self-propelled all-purpose tractor (*Jari*) has 20-in. scoop that can handle the fluffy white stuff up to 24 in. deep. Clears 36-in. path, throws snow up to 30 ft. **(249)**

Training electronic technicians? Better get yourself copy of brand-new report (*U. S. Dept. of Labor*) on Raytheon program. Free. **(250)**

Well-dressed men who work where there's danger of falling objects wear Topgard hats (*Mine Safety Appliances*). They're made of injection-molded poly-carbonate, one of those exotic high-impact thermoplastics. **(251)**

Production benefits of numerical control are now available to smaller metal-working companies through low-cost programing system (*Remington Rand Univac*) for controlling automatic machine tools. Cost of writing instructions has often been prohibitive for all but largest concerns. Booklet shows how solid-state computer directs tools at Rohr Aircraft. **(252)**

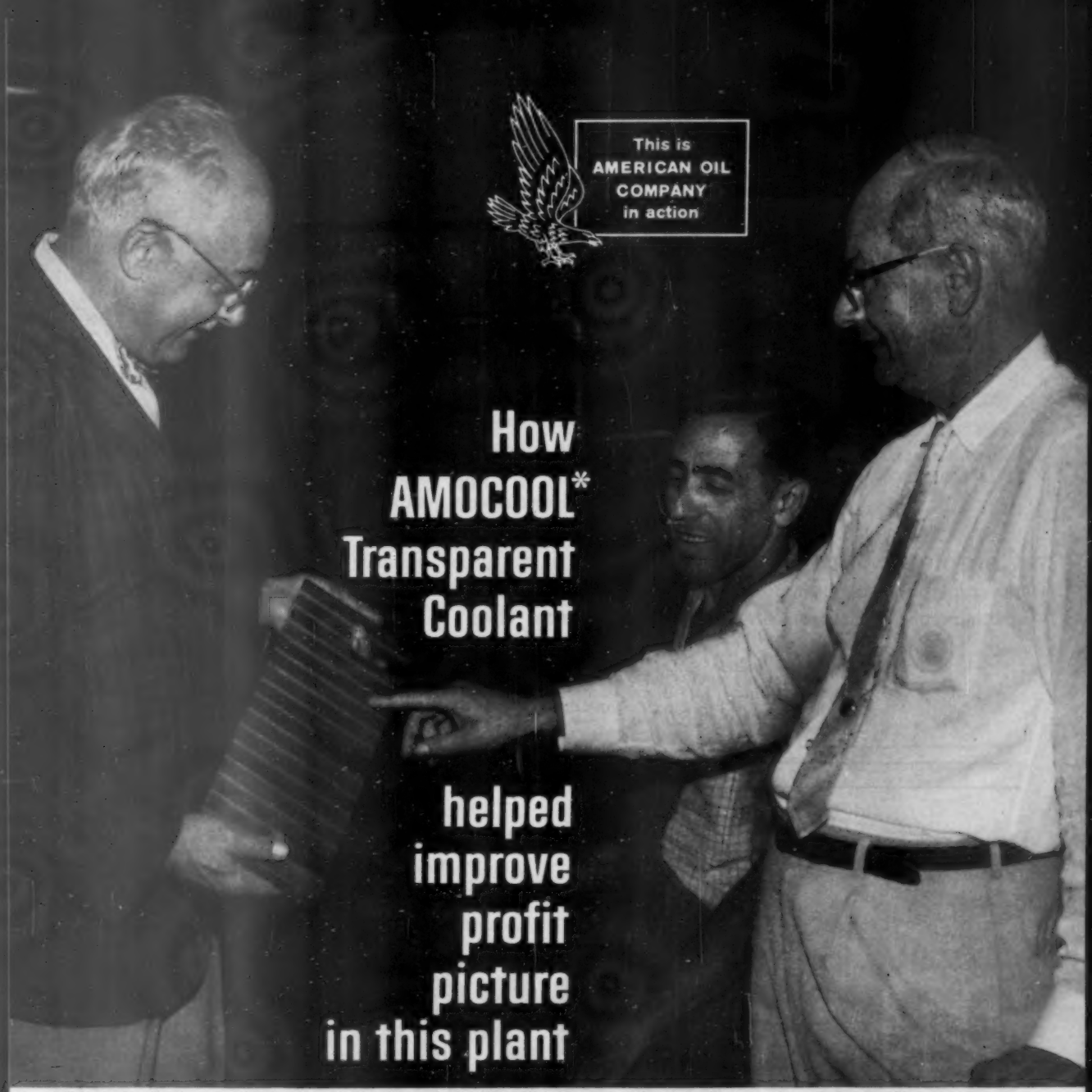
Nylon pressure tubing (*Garlock*) is light, strong, flexible. Withstands high pressures. Is easily installed. For most kinds of hydraulic or pneumatic service. Costs a lot less than copper, aluminum, stainless steel. **(253)**

No time wasted in matching extinguisher to hazard! Not with new 10- and 20-lb. portables (*Kidde*). They're UL-approved for all three classes of fire. No training needed. Just aim and pull trigger. Powerful, non-turbulent powder discharge snuffs out fire quickly, safely, surely. **(254)**

Your receiving department will give three times three cheers for Roto-Cutter (*Strapping Material Co.*). It cuts steel strapping without snipping. One end is held down by tool, other flips away from operator. **(255)**

Frostproof faucets (*Mansfield Sanitary*) work like any other outside water shut-off. But, by means of extension tube and valve seat, they shut off water inside where it's warm. No water reaches zero zone. **(256)**

Turn the page



How AMOCOOL* Transparent Coolant helped improve profit picture in this plant

Eliminate reworking because of rust, reduce wheel loading and extend intervals between wheel dressings; do these and you increase profit per unit, explains Detroit Edge Tool president, Dan Ebbing, to P. E. "Pappy" Stratton of American Oil. Sam Vineh, operator, looks on.

by PAUL E. "PAPPY" STRATTON

About the Author.

"Pappy" Stratton has been providing technical help on lubrication and metalworking problems to customers in the Detroit area for nearly all of the twenty-five years he has been working for the company. In addition to having this store of practical experience to help him, Pappy has completed the Company's Sales Engineering School.

☆ ☆ ☆

By using a soap-base grinding compound, Detroit Edge Tool Company was getting excessive corrosion and rust on work and grinding machines. Oil vapor was collecting on machines and on the ceiling, causing dirty working conditions. Most important, high wheel loading was causing frequent down-time for wheel dressings.

We worked out a test program on AMOCOOL Transparent Coolant with the management. On our first test on one surface grinder, feed pressure was cut substantially while at the same time metal removal was increased.

The cost of reworking parts to remove rust was eliminated. Time required to clean machines to get rid of the odor was cut in half. Less wheel loading and fewer wheel dressings have upped production and reduced costs. Our test program paid out in an improved profit picture. All grinding and drilling equipment has been converted to AMOCOOL Transparent Coolant.

☆ ☆ ☆

Would you like this kind of technical help to assist you in improving profits? Get it by calling the American Oil Company office nearest you.

*Trademark

AMERICAN OIL COMPANY

AMERICAN

910 SOUTH MICHIGAN AVENUE
CHICAGO 80, ILLINOIS

For more facts Circle 519 on Reader Service Card

For more data, circle item numbers on Reader Service Card next to back cover.

Newest paper shredder (*Shredmaster*) has knurled cutters that chew up plastic address plates, credit cards, carbon paper without slippage or clogging. Or alloy steel cutters that crunch through paper clips. **(257)**

Nycoil, if you haven't already met up with same, is nylon air hose that stretches, recoils like phone cord—out of way when not in use. **(258)**

Quick Height is new posture chair (*Toledo Steel Furniture*) in wide range of heights, each adjustable 7½ in. upwards without tools. Posture seat distributes weight over hips and thighs without restricting circulation under knees. Allows on-the-spot change from swivel to non-swivel. **(259)**

Completely lint-free because they're 100% nylon, including threads, is advantage claimed for work gloves (*Standard*) designed for handling and inspecting critical components without contamination. **(260)**

Low-cost power shear (*W.P.B. Industrial Products*) weighs only 4 lb., leaves clean edge on sheet metal, plastics, aluminum, brass, copper. **(261)**

compare

LIFT TRUCKS

Power and Performance

Allis-Chalmers' OWN — POWER-CRATER engine is engineered specifically for Allis-Chalmers lift trucks. Has unique crater-shaped combustion chamber that sets up violent swirling turbulence for thorough mixture of air and fuel, resulting in responsive power and maximum fuel economy.

Operator Effectiveness

Familiar, automotive-type controls — wide, adjustable seat — unobstructed floor — these and many other conveniences help operators work faster, safer.

Accessibility

Service and maintenance in a minimum of time.

Versatility

Masts, carriages, forks and attachments to fit the job — constant-mesh, two-speed transmission or POWER SHIFT torque converter drive — choice of fuel and tires. New special-purpose trucks, with high underclearance and quickly removed counterweight, in 6,000, 7,000 and 8,000-lb capacities.

ALLIS-CHALMERS

Must you trim gates, prues, excess material from molded rubber plastics? Cut rubber sheeting, thermoplastic fabrics? Then low-voltage hot knife (*Sta-Warm*) is for you. Blade temperature is 950 F. **(262)**

Speaking of gloves (as we were a while back), the new 5-finger Dura-Weave (*Asbestos Cloth Products*) permits handling of parts at 1700 F. **(263)**

Outdoor padlock won't freeze. Or rust. Face of lock (*CLM Industries*) is protected by flush-fitting, flip-up lid held in place by stainless steel flat spring. Housing is one-piece aluminum alloy. Swing yoke breaks through heaviest ice coating as lock is opened. **(264)**

Sani-Kitt will appeal especially to small-plant operators who yearn for sweet-smelling washrooms. Cleaning aid (*Plunkett*) contains chemicals, scouring powder, steel wool, sponge, mop, plastic gloves. **(265)**

You'll find more than 100 timers, from basic stopwatch to synchronous chronoscope, for measuring to 1/100 min., in new catalog (*Heuer*). **(266)**

and you'll **choose**

ALLIS-CHALMERS "F" Series

Have your dealer show you the many dollar-saving differences in Allis-Chalmers "F" Series lift trucks. Ask for new bulletin BU-680. Allis-Chalmers, Milwaukee 1, Wisconsin.

POWER-CRATER is an Allis-Chalmers trademark.

Capacities to 10,000 lb

. Lift Trucks with the Dollar-Saving Difference!

BH-180

AID

Analyze
Inefficient
Doors

*

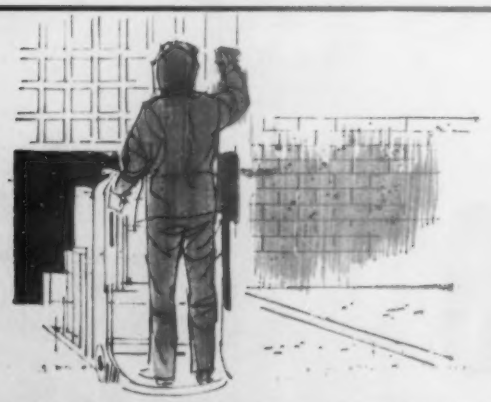
how recently have you studied these 8 areas for cost reduction

through increased door efficiency?

Plant doors affect your operating profit. They can make money or lose money for you. They substantially affect flow of material, productivity of people and machines, environmental control, and maintenance.

Eliminate inefficient doors and slash indirect costs with Barber-Colman's AID* Plan. This assures a properly planned, highly efficient door system requiring minimum maintenance . . . helps keep production on the move, adds an extra measure of quality control to your operation.

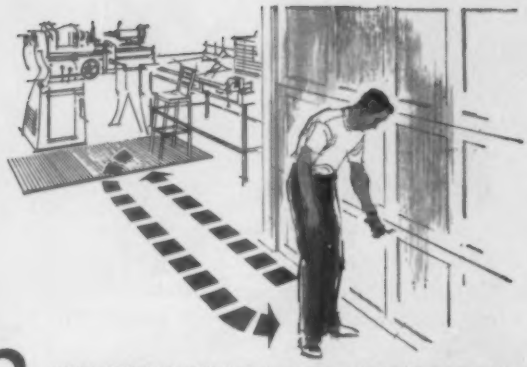
An analysis of these 8 areas will help you engineer more value into your products, and more profits from them . . .



1 **MATERIAL HANDLING** comes to a sudden stop when a "most important" door breaks down. Productivity of handling equipment and operators is a complete loss during this time. Let Barber-Colman show you how to anticipate *and prevent* with the AID* Plan.

2 **PRODUCTION** slows down or stops when materials are delayed due to door breakdown. Cost of lost production plus downtime of machine and operator can be high. Let your Barber-Colman door specialist help analyze and eliminate this.

* **Analyze Inefficient Doors** to *anticipate* and *prevent* unnecessary plant-operating costs. Are your plant doors struggling to meet todays' production requirements, yet designed to match conditions of ten or fifteen years ago? To make certain that they are properly integrated with building function and production flow, your Barber-Colman door specialist can help you analyze them with the Barber-Colman DOOR SYSTEM ANALYSIS—a detailed, 41-point check list. It will help you locate sources of existing door inefficiencies, reasons for excessive door repair and maintenance, bottlenecks in material handling, and possible unnecessary loss of productive manpower. Call today (see yellow or white pages) or write us direct.



3 **"WALKING LABOR"** costs mount up fast. When a man leaves a production job or material handling unit simply to open/close doors you have another indirect cost. Barber-Colman AID* Plan provides the solution.

4 **HEATED OR COOLED AIR** is expensive to make, important to save. Do your doors seal tightly, or are profits leaking out through "holes" you don't see? Your Barber-Colman door specialist will help analyze and solve the problem.

5 **DUST-FREE, DEHUMIDIFIED OR OTHER SPECIAL CONDITIONED AIR** may be necessary to maintain accurate quality control for your product. Costs to make, costs extra if you lose it. Find and solve the problem with the Barber-Colman-AID* Plan.

6 **MAINTENANCE** costs go down when doors close tightly. Drafts, contaminated air, dirt, dust, grit are sealed out. Let the Barber-Colman door specialist analyze your door system to make certain it is doing this.

7 **EMPLOYEE HEALTH, COMFORT** are affected by the efficiency of a plant's doors. Give employees the best protection and you've reduced another indirect cost. Barber-Colman AID* Plan helps you do this.

8 **ACCIDENTAL DAMAGE, INJURIES** can happen when doors are not efficiently planned or operated. Find out how to prevent these dangerous occurrences and unnecessary costs with the Barber-Colman AID* Plan.

BARBER COLMAN

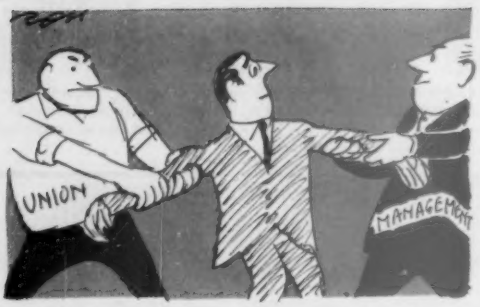
BARBER-COLMAN COMPANY, DEPT. AF 111, ROCKFORD, ILLINOIS

OVERdoors

...helping industry boost efficiency

HUMAN RELATIONS

By Vivian Lunardi Assistant Editor, FACTORY



Coming: white-collar tug of war

Unionization of the white-collar worker is no immediate threat at the moment. But labor is pulling up its big guns in view of the changing work force. So it's about time for management to muster its reserves for the coming struggle, says Eugene A. Hoffman, labor relations manager at Minneapolis-Honeywell Regulator Company, Minneapolis, in a recent *Manage* article.

These figures are enough to take the starch out of labor: 27% increase in white-collar workers during 10 years (between 1950-60) with only 4% increase in blue-collar workers; 5% drop in semi-skilled and 12% drop in unskilled. White collars outnumber blues, a trend that probably will continue. To survive, unions must organize the white-collar group.

How does management fight back? With a well-administered competitive wage-salary and benefit program. But that's not all. A white-collar man must also be made to feel he is performing a useful role in the company. This knowledge, gives him status. Fortified with these tools, management easily can stem organized labor's advance, says Hoffman.

Silence not golden in politics

The political voice of business has atrophied from disuse, says Harry R. Hall, executive vice president, Michigan Chamber of Commerce, Lansing. Major surgery is needed to replace management's traditional indifference to active, direct participation. Otherwise, businessmen must continue to suffer control by unsympathetic men.

What must be done to survive this control? Groom more politically oriented men and women to neutralize the power of the "professional politicians" who now control business through various legislative, judicial, and administrative mechanisms.

Labor, on the other hand, has made hay politically, says Hall. It has groomed candidates and built political machines. The labor press conditions members for "practical political action."

To get on the bandwagon, business must convince its people that there is no stigma connected with political action. Only when politics becomes a duty of management, as well as a duty of citizenship, can business hope to equalize the weight in the political arena, concludes Hall.

Sense worth a pile of dollars

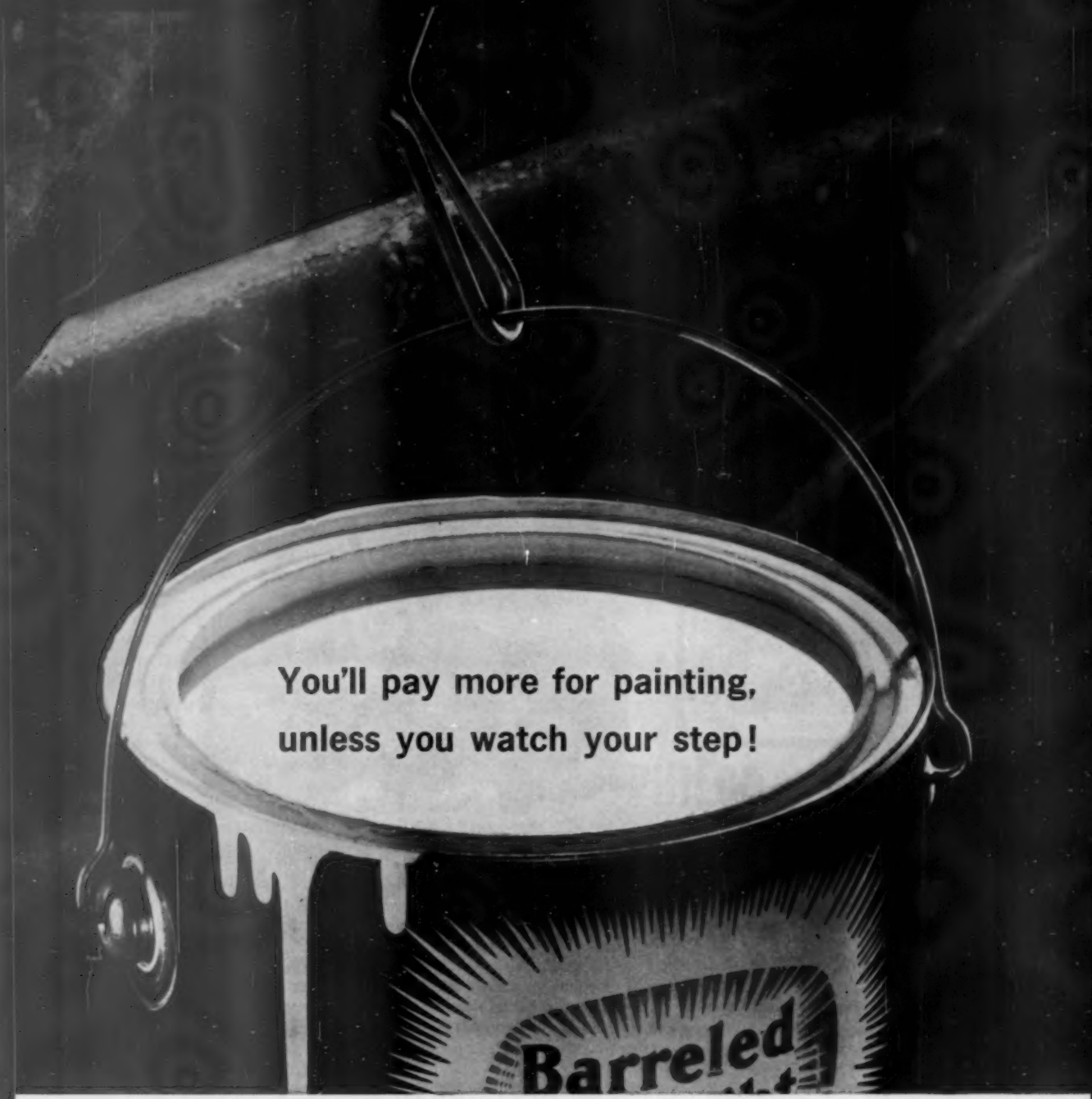
The power of suggestion dealt American industry a $15½ million blow in 1960. That's the tidy sum ($15,690,119) paid to employees by 237 companies for nearly a half-million adopted suggestions. Among companies surveyed by the National Association of Suggestion Systems (Chicago) Boeing Airplane Company gave the largest single award of $9985. Other over-$5000 awards included Garlock Packing Company, $9620; American Cyanamid Company, $8350; General Electric Company, $8020; International Business Machines Corporation, $7500; Swift and Company, $6608; Ford Motor Company, $6000; and Eastman Kodak Company, $5100.

Average individual payoff is inching up. Now it's $33.48 compared with $30.22 in 1955.

Bankrolling the brotherhood

Dues check-off at General Motors Corporation affords a keyhole look at the financial solvency of the United Auto Workers. Walter Reuther is on the receiving end of over $52,000 a day from GM workers. Since the check-off system began in April 1946, GM has turned over $150,071,641 to the UAW in dues, reports the U.S. Chamber of Commerce, Washington, D.C.

Turn the page



(Climbing labor costs make it imperative you pick your paint with care.)

Field reports from Barreled Sunlight Paint representatives show labor costs eating up *80¢ of every painting dollar*. At this rate, you can see why it's important to pick paints that go on faster, easier. (The superior "hiding" and spreading capacity of Barreled Sunlight Engineered Paints pay off in labor savings up to 20%!) ✓ ✓ You can also see why it makes good sense to purchase paints that last longer . . . the fewer repaints, the lower your labor *and* material costs. This you can be sure of with Barreled Sunlight Paints. Because they're engineered to resist wear, weather and washing, Barreled Sunlight Paints hold their color, finish and "newly painted" look as much as 50% longer than other paints. ✓ ✓ See for yourself. Call in the man from Barreled Sunlight for a free "On-The-Wall" Demonstration. Write Barreled Sunlight Paint Company, 124-K Georgia Avenue, Providence 5, Rhode Island.

2 FREE GUIDES

The famed Barreled Sunlight "Quick Reference Guide" to more than 50 Engineered Paints, Primers and Undercoats plus a 10-page booklet on "How To Reduce Painting Costs." Write for them.

Barreled Sunlight Paints

ENGINEERED

For a Better Looking, Longer Lasting Paint Job at Lower Cost

For more facts Circle 522 on Reader Service Card

ONLY CERTAIN SEAGULLS

ARE CERISE... Most gulls are white or gray-white with dark speckles. But the Massachusetts Audubon Society has ingeniously painted some who nest off the New Hampshire coast an astonishing cherry color — others yellow, blue, green and black to identify *their* particular home ports — as a basis for studying how gull colonies travel and where they come from.

And the need for more complete identification isn't limited just to seagulls. Think of your *own* products and packages: could they advantageously tell the buyer, handler or user *more* than they do now? Do they clearly give *all* the useful part or model numbers — descriptive details — installation, use and reordering instructions? Better identification such as this can give your products not only quicker recognition, but wider acceptance and increased sales as well.

And to have your products say *all* they should, at least cost and for their entire life, demands the best possible identification method. For certain seagulls, two men and a paintbrush offer the most practical way; for the items *you* manufacture, two labels or two decals you might now be using could perhaps be profitably replaced by a *single* label to save inventory, obsolescence and application costs. Or attractively *printing* the different combinations of *variables* on the products and packages might be an even better way. This is where Markem can help you with a combination of method, machine, type, ink and service all dovetailed to *improve* your product and package identification — or *save* you money — or *both*.

Are you absolutely sure you *can't* improve your present method — that one simple idea might not help your products say more at the same or lower cost? Asking us for our recommendations won't cost you a cent . . . but could make a world of difference. Write Markem Machine Co., Keene 18, N. H.

Here's specific information on effective, economical ways to "Help your product speak for itself" with Markem methods and equipment. Write for your copy of this informative folder now.

MARKEM

HELPS YOUR PRODUCT SPEAK FOR ITSELF

For more facts Circle 523 on Reader Service Card!

Begins on page 222

What do you bid besides money?

When the price is right (and we don't mean cash) you can get an executive to switch loyalties. A top man in the $50,- to $100,000 range is not likely to be tempted with a moderate salary increase. But offering fringe benefits and deferred compensation plans work like magic.

Such has been the experience of Spencer Stuart Associates, Inc., Chicago executive recruiters. One stubborn fellow wouldn't move without this impressive string of benefits: Early retirement (5 years sooner); work in a tax-free country, free housing, and a 10-year contract with provisions for personal accumulation of capital.

When all else failed, one firm bought out the company to get the president.

Another incentive: Offer to increase the value of a man's personal estate without cost to him. This involves (with many variations) lending him money for life insurance premiums at no interest, absorbing taxes, and carrying the policy on company books as an asset. If the man dies, his family gets the face value of the policy less company payments.

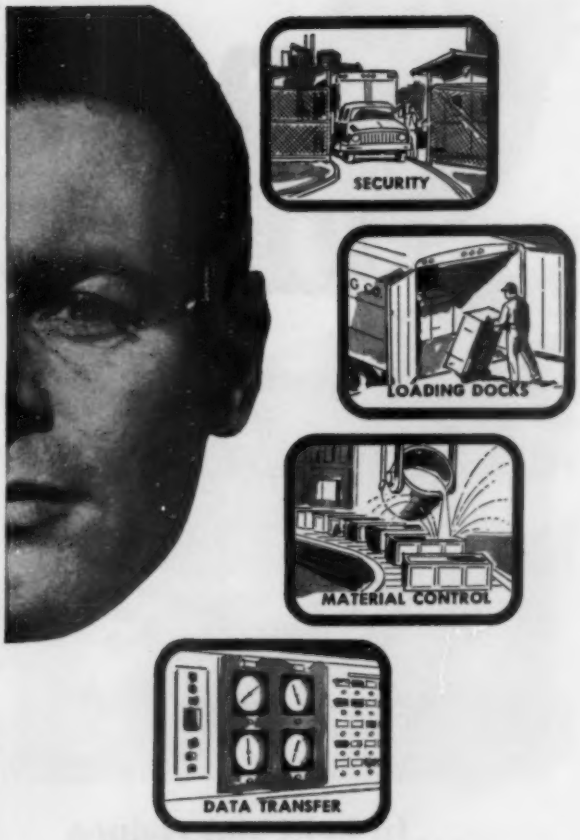
Cut costs, increase employment

An appeal to employees to reduce costs may seem like a naïve approach, but it worked for Kaydon Engineering Corporation, Muskegon, Mich. In effect a year, the program has increased productivity and cut manufacturing costs with a resulting reduction in product price. Furthermore, the union and shop committee support it right down the line.

Effective communications between company and workers did the trick. At meetings a year ago, employees were told of the competition that hampered the company's growth. Workers then volunteered to establish lower incentive rates, but increase their productivity. This did not affect take-home pay.

Shortly thereafter, the price of the product was cut. The second reduction came (August 1961) as other manufacturers of needle rollers and bearings raised prices. Automation of some operations and changes in tooling made the second cut possible.

Turn the page



PHILCO CLOSED CIRCUIT TV

has proven invaluable in relieving the difficult and awkward in-person monitoring of many plant operations . . . material flow on conveyors . . . bin levels . . . loading dock traffic . . . gate traffic . . . gauge watching. In addition, closed circuit TV can be used in employee instruction and plant communications. Highly developed, fully transistorized equipment featuring Philco's "building-block" design assures ease of operation, freedom from maintenance and permits future expansion without costly replacement. Write today for your copy of the Philco Closed Circuit TV System Planning Guide.

Government & Industrial Group
4700 Wissahickon Ave., Philadelphia 44, Pa.
In Canada: Philco Corporation of Canada, Ltd., Don Mills, Ontario
In Europe: Philco Corporation S.A., 3 Avenue Beauregard, Fribourg

PHILCO®
Famous for Quality the World Over

For more facts Circle 524 on Reader Service Card

new ideas

...to help you reduce rising warehouse costs

What can you do to combat rising storage costs? Must you build or lease additional facilities to gain needed warehouse space? How can you make existing storage space more productive?

You'll find the answers to these—and other warehousing and handling problems—in this newest RAYMOND Catalog. Profusely illustrated, this free 16-page reference is packed with ideas that could save your company thousands of dollars in the next 12 months. Write for it today!

RAYMOND *Originator of Narrow Aisle Trucks*

The RAYMOND CORPORATION
3256 Madison St., Greene, N.Y.
Please send *free* catalog on RAYMOND Narrow Aisle Handling Equipment.

NAME TITLE

COMPANY

STREET

CITY STATE

Begins on page 222

HUMAN RELATIONS

Now plans are afoot to increase the work force and invest $½ million in new machinery and equipment. This is particularly significant when it is realized that the company is based in a depressed employment state and manufactures auto component parts.

Benefits bite, but not jobs

Does this composite of the chronically unemployed worker describe the fellow knocking at your plant door? He's between 25 and 55 years old, unskilled or semi-skilled, and resides in New York, California, Pennsylvania, Ohio, Michigan or Illinois. According to the Labor Department's Bureau of Employment Security (Washington), he's receiving about $32 weekly in extended jobless benefits.

These hard-core unemployed numbered 700,000 as of mid June, 1961. About 54% are factory workers.

Nine laws for nine lives

How to get more mileage out of management men in their late forties and early fifties was suggested by Dr. J. F. Briggs at a recent American Medical Association meeting. The formula centers around weight control, daily exercise, and adequate sleep. Try developing these habits:

1. Walk, don't "cab" to lunch or commuter station.
2. Reduce caloric intake.
3. Develop a hobby, completely disassociated from business, that involves physical activity.
4. Get eight hours' sleep, unlike 77% of executives who average seven hours or less.
5. Take at least 2 weeks' vacation away from home instead of one week in summer, another in winter.
6. Discipline your smoking to under a pack a day.
7. Cut out business on weekends and concentrate on your hobby.
8. Ride public transportation rather than buck motor traffic in your own car.
9. Avoid shop talk during lunch.

Code as you go!

no mixing . . . no brushing . . . no drying time required

Get immediate safety and accurate identification with plastic tapes from 3M

Be sure pipes and ducts are identified correctly and quickly. Color code as you go with "SCOTCH" BRAND Colored Plastic Tapes. Because tape is fast, clean and easy to apply, there's less chance of mismarking pipes . . . or of forgetting the job. No buckets to carry. No colors to mix. A man can carry several colored tapes in one safe trip. Finish the job in less time than it used to take to clean up after using conventional coding materials. "SCOTCH" BRAND Plastic Tapes resist acids, alkalis, greases, salts and most solvents . . . stay bright and tight for years . . . yet are easy to remove or change. Choose from eight all-purpose indoor colors: yellow, red, green, black, orange, blue, white, or brown. Five colors also available for all-purpose outdoor applications.

TRY THIS METHOD. Ask your 3M Representative or "SCOTCH" BRAND Tape Distributor for a demonstration, or write: 3M Co., 900 Bush Ave., St. Paul 6, Minn., Dept. IBD-111.

These are the codes which use yellow tapes. For a complete list of colors and their suggested codes write us.

High-Pressure Steam

Low-Pressure Steam

Process

MINNESOTA MINING AND MANUFACTURING COMPANY

. . . WHERE RESEARCH IS THE KEY TO TOMORROW

3M COMPANY

"SCOTCH" IS A REGISTERED TRADEMARK OF 3M CO., ST. PAUL 6, MINN.

For more facts Circle 526 on Reader Service Card

New Gulf process makes Gulf Harmony®

GULF MAKES THINGS

You're looking at a new catalyst (the tiny pellets). It's the heart of Gulf's new hydrogen treating process, called Gulfinishing, used to super-finish Gulf Harmony Oil. It replaces the conventional clay treating operations previously needed to finish base stocks for this product. It makes Gulf Harmony a superior, versatile oil capable of handling a number of plant lube and hydraulic assignments. Here's how.

Gulfinishing removes more undesirable compounds than any other finishing process. It not only scrubs a base stock clean, it converts weak molecules to stable ones. It greatly improves the response of the base oil to the oxidation inhibitor. This improved response means greater stability; better protection against sludge formation; longer service life.

Improved Gulf Harmony continues to provide the

a superior oil for plant equipment . . .
RUN BETTER!

effective protection against rusting and foaming for which it has always been recognized.

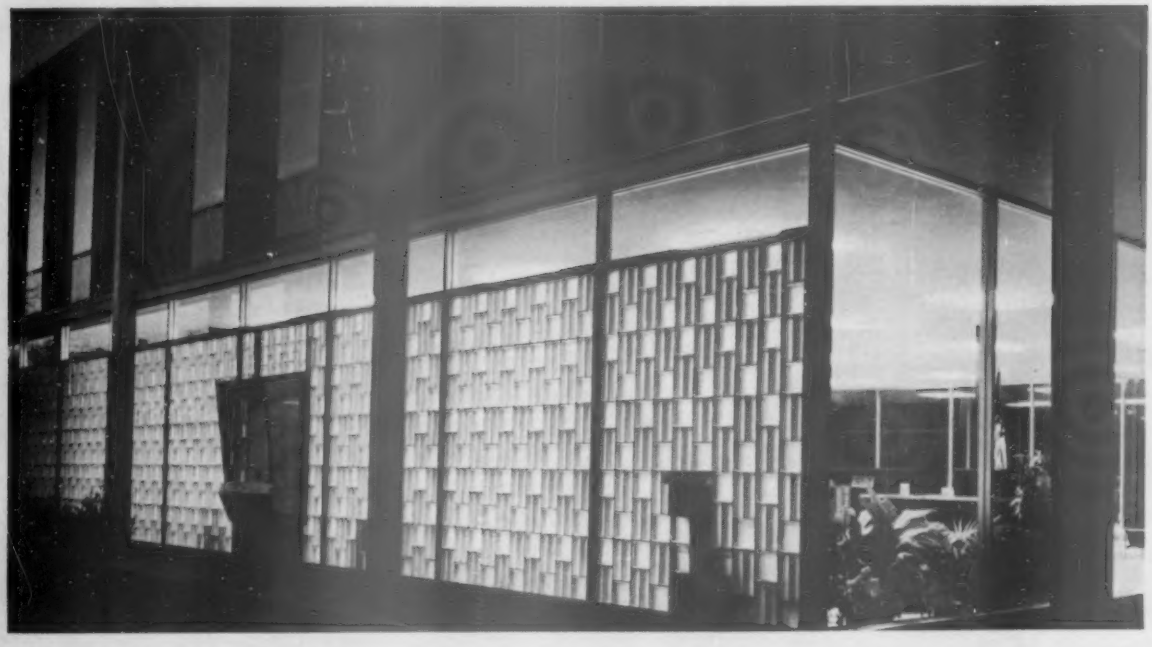
Wouldn't you like to learn more about improved Gulf Harmony? Find out what it can do for your plant equipment and prove to yourself that Gulf makes things run better! Consult the Gulf catalog in Sweet's Plant Engineering file for the address of your nearest Gulf office. Or write for free brochure.

GULF OIL CORPORATION
Dept. DM, Gulf Building
Houston 2, Texas

GULF

For more facts Circle 527 on Reader Service Card

See why Pittsburgh Corning Products make the things you build look better, last longer, cost less



example: PC 4x12 Glass Blocks to add new eye appeal to the functional benefits of the daylight wall

Strong eye appeal has taken its place beside function as an important requirement in plant and office building design. That trend has called for new flexibility of materials—to add visual vitality to basic function. That is what the PC 4 x 12 is all about.

Here—in a striking dimensional variation of the PC Glass Block—you gain almost limitless capacity to inject new visual vitality into the daylight wall. Take for example the wall design displayed above. Creative interpretation of the light transmitting wall presents an attractive contemporary flair without sacrificing the basic value of functional use of transmitted light.

The PC 4 x 12 represents Pittsburgh Corning's constant attention to your growing need for materials which free design from purely mechanical construction.

PITTSBURGH PC CORNING

For more facts Circle 528 on Reader Service Card

example: new 1½" thick
FOAMGLAS-BOARD® Roof Insulation

All the known benefits of FOAMGLAS® Insulation are available now in new, large FOAMGLAS-BOARD — 1½ inch blocks of FOAMGLAS sandwiched between special kraft-laminated paper in 2′ x 4′ unit size. It can be installed quickly and economically on a roofing project.

FOAMGLAS-BOARD cuts labor time, reduces roof joints and is easily cut and shaped to fit around obstructions. The accepted FOAMGLAS benefits are still incorporated — water-proof, vapor-proof, strong, dimensionally stable . . . with high compressive strength.

For more complete information on FOAMGLAS-BOARD, simply check the coupon to receive a free copy of our new brochure.

PITTSBURGH CORNING CORPORATION
Dept. FF-111, One Gateway Center, Pittsburgh 22, Pa.

Please send me descriptive literature on the products checked below.

- ☐ FOAMGLAS-BOARD
- ☐ FOAMGLAS Roof Insulation
- ☐ PC GLASS BLOCKS
- ☐ The PC 4 x 12 Block
- ☐ PC Color Glass Blocks
- ☐ GEOCOUSTIC™ (a new acoustical product)
- ☐ FOAMGLAS Low Temperature Insulation
- ☐ FOAMGLAS Insulation for Industrial Piping
- ☐ FOAMGLAS Stay-Dry Pipe Insulation for building chilled and dual-temp lines
- ☐ FOAMGLAS for Curtain Wall Panels
- ☐ PC Sculptured Glass Modules

Name_____

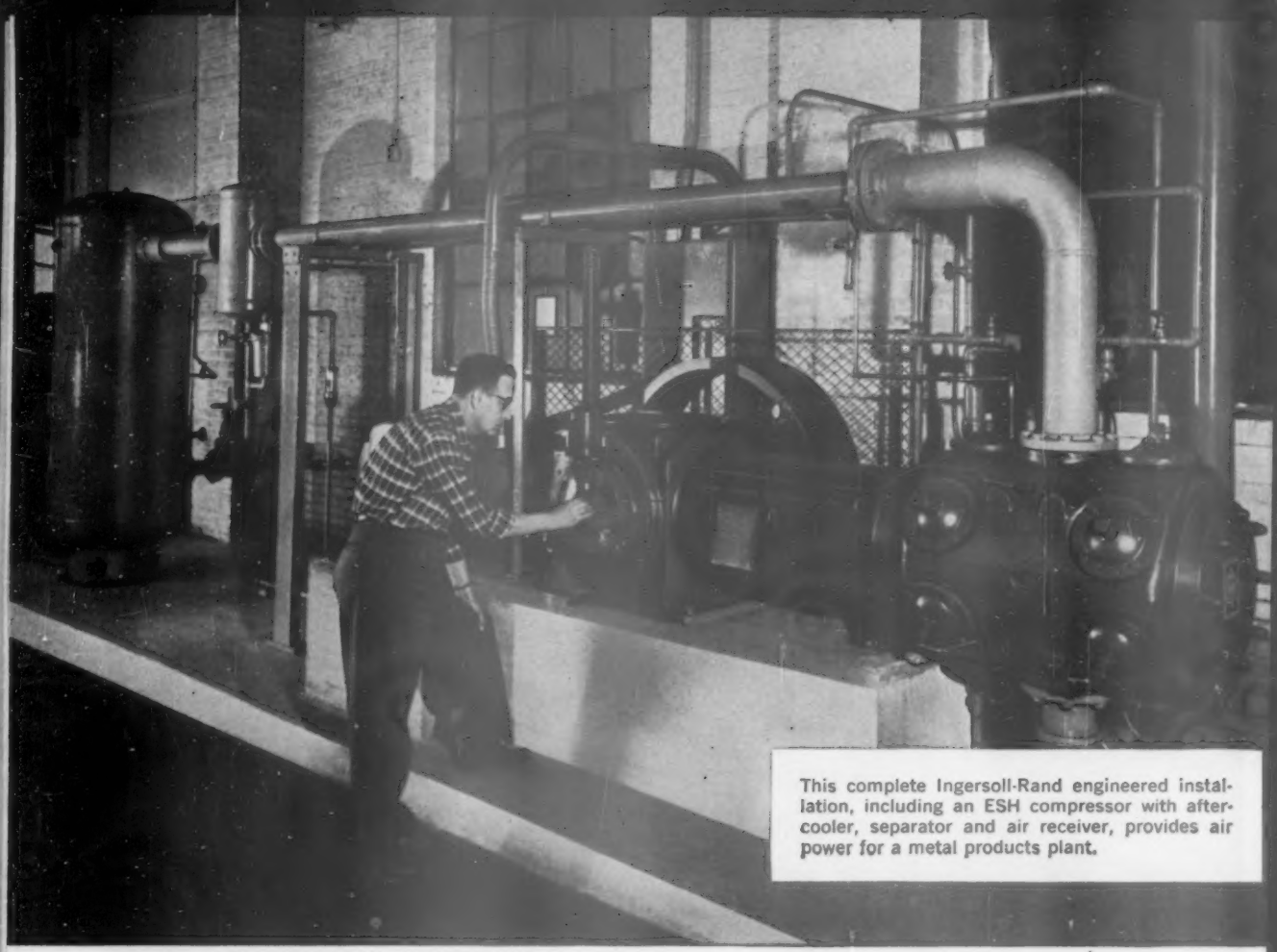
Company_____

Address_____

City_____ Zone_____ State_____

PITTSBURGH PC CORNING

For more facts Circle 529 on Reader Service Card



This complete Ingersoll-Rand engineered installation, including an ESH compressor with aftercooler, separator and air receiver, provides air power for a metal products plant.

Here's why

TIME TELLS THE DIFFERENCE

in Ingersoll-Rand compressors

"No bearing wear in 60,000 hours"..."43,680 hours with no valve maintenance required"..."63,648 hours with no forced maintenance"..."13 years without even *cleaning* the valves". That's what our customers have been telling us, and there are many more true case histories like them which prove the *long-range economy* of Ingersoll-Rand compressors.

The *extra value* that's built into every type of Ingersoll-Rand compressor pays off with reduced maintenance and attention over many years of operation, and the result is big savings in the cost of your air power. Ingersoll-Rand offers also the *most complete* line of compressors, in reciprocating, centrifugal, axial-flow, rotary and thermal types. There are units from ½ to 25,000 hp, for pressures from one micron to 125,000 psi. Call your I-R man today for help on your job.

ESH	PHE	XLE	PRE	HHE	XPV
20 to 150 hp	75 and 100 hp	125 to 350 hp	400 to 2000 hp	200 to 4000 hp	(steam-driven) 200 to 1500 hp

For more facts Circle 530 on Reader Service Card

Only
Ingersoll-Rand
air compressors
give you all
these
EXTRA VALUE
features...

AIR-CUSHIONED CHANNEL VALVES
Known for high efficiency, quiet operation and exceptional durability. Entirely different. Each valve is a combination of rigid stainless-steel channels and bowed leaf springs, with trapped-air spaces which cushion action, prevent impact. Separate stainless-steel seat plate may be turned over or replaced for new life.

FULL-FLOATING ALUMINUM BEARINGS
Never need fitting or adjustment. They "roll with the punch" of each stroke, to distribute the load evenly over inside and outside surfaces.

FULL FILTERED PRESSURE LUBRICATION
Filtered oil under pressure to all bearing surfaces cuts wear to minimum.

SEALED FRAME
Keeps out dust and dirt, the major cause of wear. Keeps oil in.

and the World's
Most Comprehensive
Compressor Experience

Ingersoll-Rand
255A1
11 Broadway, New York 4, N.Y.

CATALOG NEWS

For more data, circle item numbers on Reader Service Card next to back cover.

PIPES, VALVES, AND FITTINGS

1—Packings. Manufacturer's complete line of pneumatic and hydraulic packings is described in 16-page bulletin (No. 341). Covers packings made of leather, rubber, fabric, and Teflon. Explains application. *Chicago-Allis Mfg. Corp.*

2—Rubber hose. New line of non-skive hydraulic rubber hose is available in bulk or fitted assemblies. Catalog R300 (16 pages) includes data for single- and double-reinforced hose. *Titeflex, Inc.*

3—Solenoid valves. This 16-pager (supplement to complete catalog) covers new 2-, 3-, and 4-way solenoid valves. Tables of pressure ratings for valves for air, gases, water, light oil, and other liquids. *Automatic Switch Co.*

4—Non-metallic pipe. Three booklets (32 pages total) tell all about centrifugally cast, thermoset epoxy resin, glass fiber reinforced pipe. Topics covered include applications, specifications, physical properties. *Fibercast Co.*

5—Gate valves. Circular 561 (4 pages) describes gate valves for use where corrosive actions are too severe for lighter valves. Covers applications and features of iron body, bronze mounted valves, and all iron valves. *Lunkenheimer Co.*

6—Metal hose connectors. Stock flexible metal hose connectors are listed in 4-page Technical Bulletin No. 26. Includes applications, specifications, charts of working-pressure correction factors, other data. *Atlantic Metal Hose Co., Inc.*

7—Ball valves. This brochure (4 pages) features comparison of original, maintenance, and inventory costs of company's ball valve with standard ball and gate valves. Lists sizes for five types of pipe ends. *Worcester Valve Co., Inc.*

8—Boot seal valve. Boot eliminates metal-to-metal contact in stainless steel valve. Especially suitable where product purity is important. The 4-page illustrated booklet describes, lists special boots for many products. *Stehlin Corp.*

9—Diaphragm valves. Catalog No. 171 (4 pages) discusses diaphragm valves featuring O-ring construction, which eliminates stuffing boxes. Available in bronze and steel bodies to control pressure, govern pumps. *Atlas Valve Co.*

MECHANICAL

10—Speed reducers. Catalog 42C presents 24 pages of data on single reduction, right-angle spiral bevel gear speed reducers. Includes formulas for selection, guide for determining load characteristics, and more. *D. O. James Gear Mfg. Co.*

11—Tensioners and idlers. Universal drive tensioner for chain and belt drives is described in 4-page Bulletin 7161. Also lists specifications for bronze bushed V-pulley, flanged pulley, and sprocket idlers. *Brewer Machine & Gear Co.*

12—Oilers, controls. Bottle oilers for plain bearing lubrication, constant oil level controls, glass body and bronze oil cups are described in Circular 580 (4 pages). Covers installation techniques, applications. *Lunkenheimer Co.*

13—Rod ends, bearings. Catalog 102 (12 pages) tells about large size rod ends with bores up to 2 in., and control rod assemblies in 6 sizes. Gives construction features, applications, other information. *SBB Div. of MPB, Inc.*

14—General purpose cylinder. This 4-page bulletin (No. 0220-B1) discusses quality, economy, and versatility of 200 psi. Series C air power cylinder. Single and double rod-end models come in 5 bore sizes from 1¼ to 4½ in. *Hannifin Co.*

Turn the page

Begins on page 233

CATALOG NEWS

For more data, circle item numbers you want on Reader Service Card.

INSTRUMENTS AND CONTROLS

15—Leak detectors. Bulletin GEA-6817A (8 pages) describes company's Type H line of portable, halogen-sensitive, electronic detectors that are sensitive enough to locate leaks as small as 1/100 cu. in. *General Electric Co.*

16—Digital recording systems. Here's an 8-pager (No. 7000) that discusses modular digital data systems for alarm scanning and recording of almost any type or combination of analog values. Application details. *Monitor Systems.*

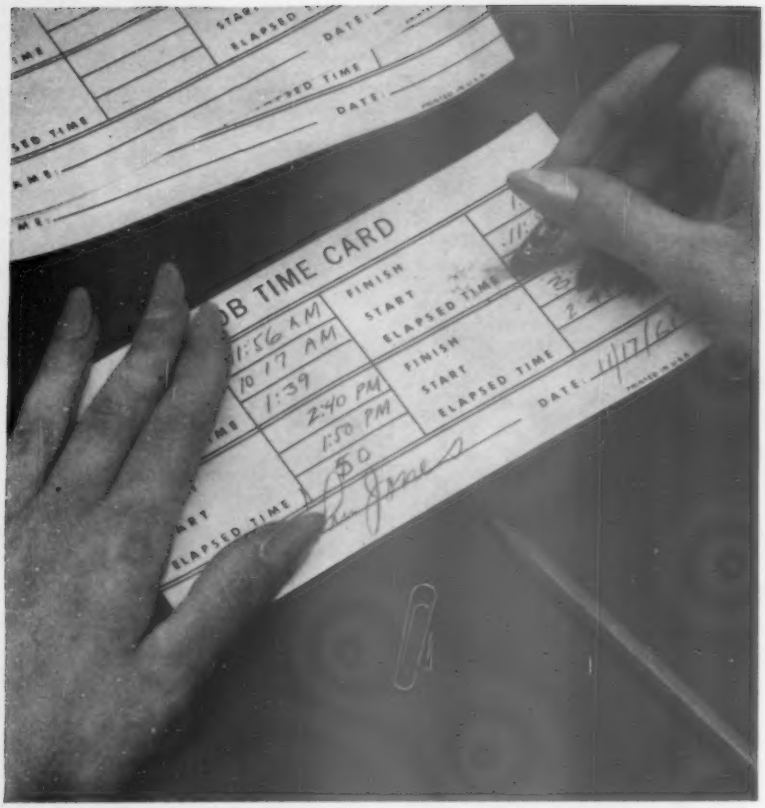
17—High-speed computer. This bulletin, "For Better Business Control," outlines applications and specifications of company's medium-scale 400 computer. Explains how computer cuts costs of handling paperwork. *Minneapolis-Honeywell Regulator Co.*

18—Pressure transmitters. Bulletin G21-4 (4 pages) and two specification sheets (E21-4, P21-4) describe differential pressure transmitters, pneumatic and electrical pressure transmitting mechanisms. Diagrams, photos. *Bailey Meter Co.*

19—By-pass rotameters. This 8-pager (No. 116) tells how measurement and control of flow rates in pipe sizes as high as 48 in. can be done economically. Data on capacity determination, flow range, etc. *Brooks Instrument Co., Inc.*

20—Meters, accessories. Descriptions, specifications, and dimensions are given in Catalog P&I-2000 (28 pages). Covers industrial, rotocycle, petroleum tank truck, other meters, packaged units for liquids. *Rockwell Mfg. Co.*

21—Shock, vibration control. Here's a 4-pager (No. 101) with specifications, design features, applications on standard shock absorb-



How much does "old fashioned" job time calculation cost?

Only you can know for sure what your company pays every day for clerks to calculate and record elapsed (actual working) time in your plant. With Calculagraph you can save these costs because it does the calculating — and without error — automatically and fast. A large eastern manufacturer found this out when he installed Calculagraph. He is now saving the cost of one clerk per 200 production employees. Annually this comes to important dollars. Why not check your costs now?

HOW THE CALCULAGRAPH "500" METHOD SAVES MONEY

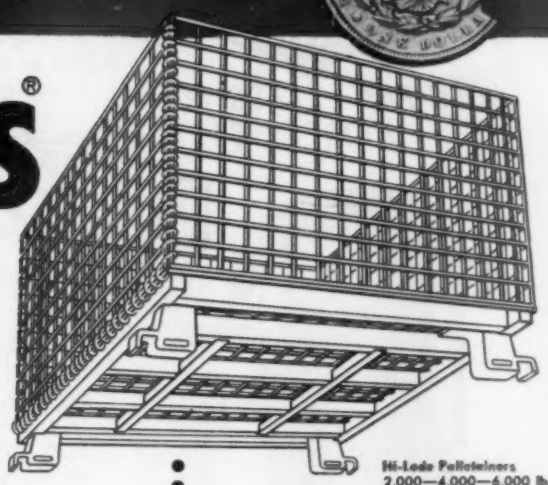
The Calculagraph "500" is the most unique job time recorder on the market today because it *calculates*, as well as prints, the record. The production employees merely ring "in" and "out," and one Calculagraph can serve an entire department. Existing job cards usually can be adapted easily for use with the Calculagraph. Write for new "Pocket Digest."

CALCULAGRAPH COMPANY
273 Ridgedale Avenue, Hanover, New Jersey

LEADING THE ATTACK ON

INDIRECT COSTS

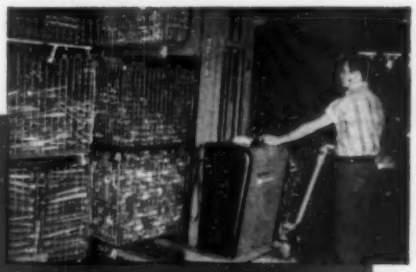
USP PALLETAINERS®



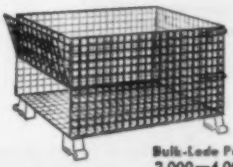
The extent of your materials handling savings is determined by *your* efficiency in handling parts or products between successive production stages, live storage, shipment and delivery. And . . . if you are interested in reducing handling costs all along the way, you'll want to know more about USP Palletainers—the engineered containers that handle *anything* better!

USP Palletainers will increase your production efficiencies *safety*, improve your plant's appearance, simplify inventories, and quickly pay for themselves in man hours and space saved. Ruggedly built to endure fast, rough handling for years to come, Palletainers are available in sizes, styles and types to suit every industrial need.

Hi-Lode Palletainers
2,000—4,000—6,000 lb. capacities

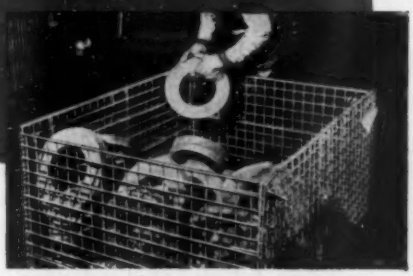


Warehouse Palletainers
3,000—4,000 lb. capacities



Bulk-Lode Palletainers
2,000—4,000—6,000 lb. capacities

Quality Control . . . progressive plants across the nation prefer Palletainers for fast, safe transportation of delicate or fragile products prior to final packaging operations.



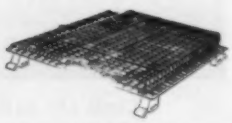
Maintenance . . . Palletainers are practically indestructible. Their sturdy, welded-steel mesh sides with reinforced structural steel channel base and safe stacking legs resist abuse and require no routine maintenance.

New USP Sanitainers
a totally new, sanitary container of steel wire mesh with heavy-duty, removable, molded Polyethylene liner. 2,000 lb. capacities

'Junior' Palletainers
for all small parts han dling-storage-transport 200 to 500 lb. capacities

Write Today . . . for your free copy of the big new Palletainer catalog plus additional detailed literature covering the new USP Sanitainers and 'Junoir' Palletainers.

Special Offer . . . you may try regular Palletainers—or the small size 'Juniors'—or the new Sanitainers in your plant on a 60-day memo billing basis. *Your obligation is freight only!*



All standard Hi-Lode, Warehouse, Bulk-Lode Palletainers "flat-fold" to save approximately 75% of return shipping or storage space.

UNION STEEL PRODUCTS CO.

515 N. Berries St., Albion, Michigan

Crenamo, Ltd.
Waterloo, Quebec, Canada

Banner Metals
Compton, California

FREE
Clean Dry Compressed Air

WHY PAY EXCESSIVE INDIRECT COSTS?

The Low Cost
General ERIE
AIR DRYER

PREVENTS

- Corrosion in tools
- Product rejects
- Frozen airlines
- Sludging of lubricants
- Production downtime
- Maintenance problems

BENEFITS

- Low cost investment
- Low cost operation
- Low dew point
- Easy in-line installation
- No regeneration
- Simple maintenance
- Saves money!

see for yourself!

In-plant, 5-minute visual demonstration by application engineers available in most areas. Send for free literature:

GENERAL WELDING and FABRICATING COMPANY
1702 PENINSULA DR.
TEmple 3-1154 ERIE, PA.

Begins on page 233

CATALOG NEWS

For more data, circle item numbers you want on Reader Service Card.

ers. All units come with either integral or external accumulators. *Ellis Fluid Dynamics Corp.*

22—Recorders. Bulletin GEA-6933A, 12 pages, lists direct- and servo-operated, switchboard and portable recorders. Includes 19 types of single- and multi-pen, ink and inkless, strip and round chart types. *General Electric Co.*

23—Multi-point gauges. Descriptions of gauges to indicate drift, pressure, differential, and temperature are included in 4-page bulletin (No. 322.11). Lists scale ranges, mounting diagrams, dimensions. *Republic Flow Meters Co.*

MATERIAL HANDLING

24—Fork lift trucks. Eight new models of Monarch heavy-duty trucks are presented in this 24-page catalog. Choice of power includes gasoline, LP-gas, and diesel engines. Photos. *Towmotor Corp.*

25—Plywood pallets. Packet of information (29 pages) contains specifications for plywood pallets, and detailed plans for 24 types. Gives case histories of specific applications, construction techniques, etc. *Douglas Fir Plywood Assn.*

26—Fork-lift trucks. Features and specifications of maker's fork-lift trucks are explained and illustrated in 22-page booklet. Capacities range from 3000 to 10,000 lb. Powered by gasoline, LP-gas, or diesel engine. *Allis-Chalmers.*

27—Conveyor engineering. Two years of research are behind new formula for horsepower requirements for belt conveyors published in Bulletin 175 (24 pages). Fully explains computation. Includes belt selection tables. *Hewitt-Robins.*

28—Storage equipment. Work benches and carts are included in this 64-page catalog (No. 488), as

There's a gold mine

Super Tube Scraper Does Fast Thorough Job

in YOUR Boiler Room!

The cost-cutting potential in the average boiler room will amaze you. It can constitute the difference between overall profit and no profit.

All fuels leave a soot residue in boiler tubes. ⅛" soot means almost half the fuel is being wasted, 1/32" a 9.5% fuel loss and ¼" a 75% loss. Tube cleaning is neglected because it has been a dirty, laborious job.

CLEAN — No soot scattered in boiler room, pushed into fire box or blown on operator with Super suction boiler tube cleaning equipment.

QUICK — All soot pulled into steel drum or container for once-and-all-disposal.

EASY — Anybody can do it without muss, fuss or hard work. Makes frequent, regular cleaning feasible.

SAVE — 9.5% to 75% of your fuel bill.

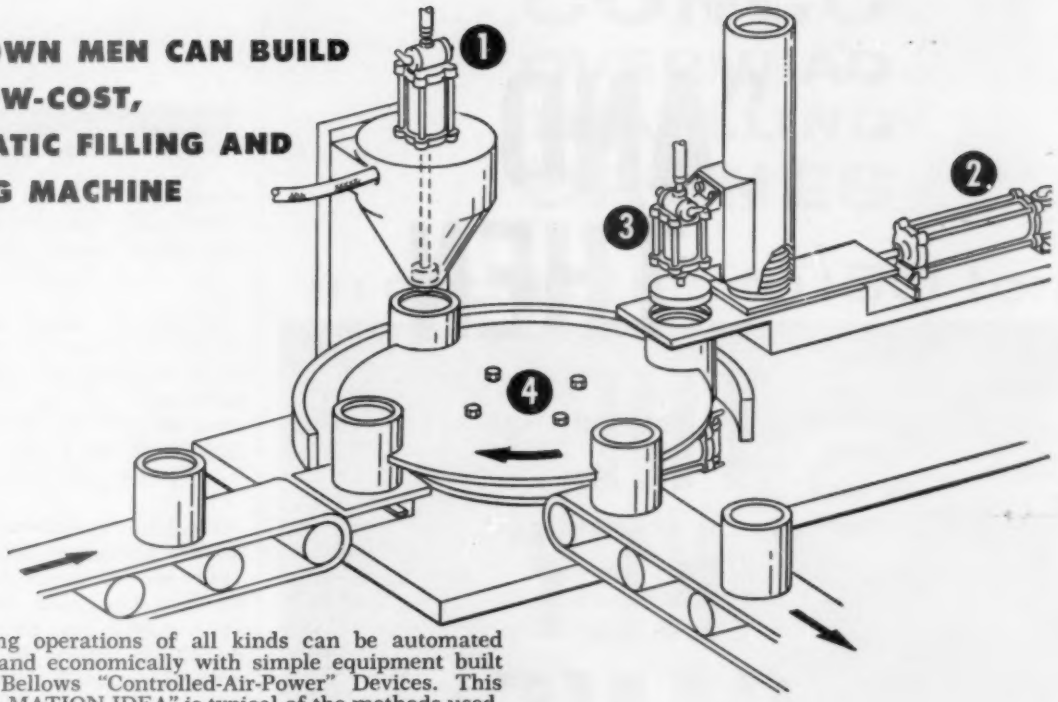
Your purchase of a Super Suction Heavy Duty Cleaner Model RS-1 or BP-2 with Super boiler cleaning tools will soon pay for itself and continue to pay generous dividends in fuel savings.

You also have the finest heavy duty suction cleaning machine built today, judged by any standards. Use it for general plant cleaning and in many production operations where powerful blowing or suction is required for removing dust, chips, recovering or transferring liquids.

WRITE for this Super brochure on boiler cleaning and Super suction boiler cleaning equipment.

THE NATIONAL SUPER SERVICE COMPANY
1944 N. 12th St., Toledo 2, O.
In Canada:
Plant Maintenance Equipment Co.
Toronto — Montreal — Vancouver
SALES AND SERVICE IN PRINCIPAL CITIES.

YOUR OWN MEN CAN BUILD THIS LOW-COST, AUTOMATIC FILLING AND CAPPING MACHINE



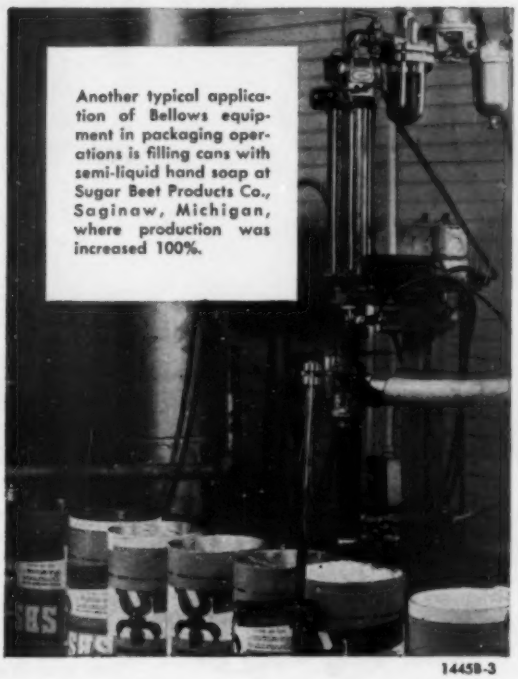
Packaging operations of all kinds can be automated quickly and economically with simple equipment built around Bellows "Controlled-Air-Power" Devices. This "SPOT-A-MATION IDEA" is typical of the methods used. Originally designed to fill and cap paint cans, it has been adapted to a variety of packaging operations. Bellows equipment has been used in packing and heat sealing plastic bags of sauerkraut, filling and capping glass pill bottles, and packaging granular material in paperboard containers, to cite a few examples.

In the sketch above, a belt conveyor feeds empty cans onto a Bellows Rotary Table equipped with a special top (#4), causing it to index through the work stations. After a container has been automatically positioned under the filling hopper, the piston rod of Bellows Air Motor #1 retracts, allowing paint to flow into the can. When a predetermined weight is reached, a limit switch is tripped and the piston rod advances to cut off the flow. At the next work station, Bellows Air Motors #2 and #3, operating alternately, deliver a lid to position and press it onto the can. At the last station, the filled and capped container is removed by a powered belt conveyor. All Bellows Air Motors are synchronized and electrically interlocked to assure proper timing and sequence of operations.

This is just one type of operation which Bellows Work Units can "spot-automate" simply and at low cost. Chances are there are scores of others in your plant. Why not investigate — *today*?

THIS SPOT-A-MATION IDEA FILE IS YOURS ON REQUEST

Contains installation data, wiring diagrams and equipment lists for the filling and capping machine as well as a score of other spot-automation applications of Bellows "Controlled-Air-Power" Devices. Write Dept. FA-1161, Bellows-Valvair, Akron 9, Ohio.



Another typical application of Bellows equipment in packaging operations is filling cans with semi-liquid hand soap at Sugar Beet Products Co., Saginaw, Michigan, where production was increased 100%.

1445B-3

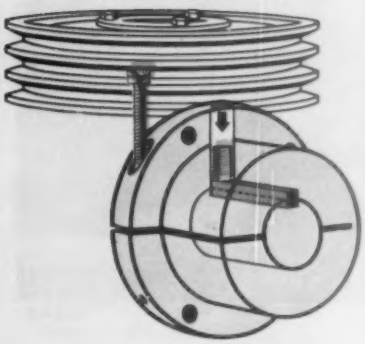
Bellows-Valvair

AKRON 9, OHIO

DIVISION OF INTERNATIONAL BASIC ECONOMY CORPORATION (IBEC)

For more facts Circle 535 on Reader Service Card

"AND THEN THE KEY CAME LOOSE..."



"Well, the key broke a window—it could have killed someone. A shaft was scored . . . the loss of drive power resulted in a loss of material . . . over $1,000 . . . we had to postpone deliveries 4 days." Frankly, this plant manager had it rough . . . though it could have been a lot worse, too. But he could have avoided the trouble completely by using Worthington sheaves that have the Two Golden Screws.

The Golden Clamp Screw at the left is an exclusive Worthington feature that locates and locks the hub securely on the shaft, permitting you to tighten the set screw without distorting the hub. And note that the two-piece hub-and-rim design simplifies installation. You install one piece at a time—or change sheaves without disturbing the hub or affecting the alignment.

The Golden Screw on the right is the set screw that turns down to lock the key securely in place. It prevents potentially damaging key drift. There's no extra cost for the set screw but it is worth its weight in gold for the safety it provides.

These Worthington hubs are standard in three major Worthington drive systems: the new, money-saving, more compact Multi-Wedge Drive; the standard Multi-V Drive and the Positive Drive. Ask for one or more of the "how-to-figure-it" design manuals shown here. Your local Worthington distributor stocks these products. He's listed in the Yellow Pages. Or write Worthington Corporation, Section 79-42, Oil City, Pennsylvania.

WORTHINGTON

PRODUCTS THAT WORK FOR YOUR PROFIT.

For more facts Circle 536 on Reader Service Card

Begins on page 233

CATALOG NEWS

For more data, circle item numbers you want on Reader Service Card.

well as many kinds of storage equipment—shelving, sorting files, drawer cabinets, drawer units, lockers, and other products. *Equipto.*

29—Walkie trucks. Electric-powered pallet and platform low-lift walkie trucks are described in 6-pager (PC-51-1). Offers specifications on 4000- and 6000-lb. capacity pallet and platform models. *Lewis-Shepard Products Inc.*

30—Pallet handlers. Pallet loaders, unloaders, and segregating systems for handling cases, cartons, bags, bales, drums, kegs, and pails are presented in 20-page catalog. Construction and operating details. *FMC Materials Handling Systems.*

31—Electric vibrators. Bulletin No. 81461 (12 pages) lists data and specifications of 14 standard pulsating-magnetic vibrators, and three pneumatic and hydraulic types. Used to promote free flow of bulk materials. *Syntron Co.*

32—Fork-lift truck. Complete specifications, charts on capacity and drawbar pull, and dimensioned scale drawings of gasoline powered fork-lift truck of 1000-lb. capacity are included in 4-page bulletin (SS-104). *Clark Equipment Co.*

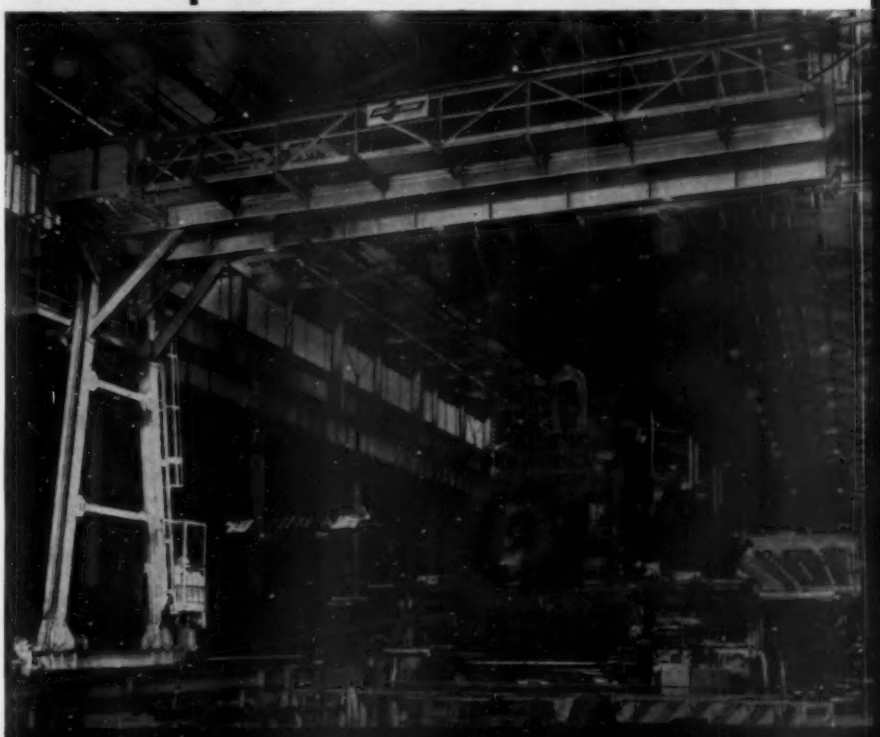
33—Electric hoists. Speedway Frame 1 electric hoists are described in 8-page catalog (DH-173). Includes standard and close-headroom hoists in 1000- to 6000-lb. capacities. Cutaway shows construction features. *Wright Hoist Div.*

34—Slings. Nylon and Dacron slings handle parts with critical surfaces. Bulletin 661 (4 pages) lists safe working loads for various hitches using grommet, eye and eye, and flattened eye slings of many widths. *The Caldwell Co., Inc.*

35—Bulk handling. Bulletin FL-661, 6 pages, describes systems for unloading, feeding, conveying and elevating, and processing bulk ma-

CONCO OVERHEAD TRAVELING CRANES

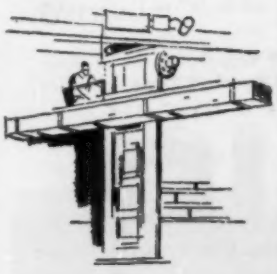
in capacities to 150 tons



Conco Semi-Gantry Crane custom-engineered for service in a Chicago area steel mill

CRANES HOISTS CONCO

Write for Crane Specifications Tablet containing five sets of general service crane specification data and forms.



For Information on Conco Cranes, Hoists and Trolleys Request Bulletin 50008

Material Handling Division
CONCO ENGINEERING WORKS, INC.
Mendota, Illinois

AFFILIATES:
SPARTAN TOOL DIVISION, Powered Sewer Cleaning Equipment
FIELD CONTROL DIVISION, Barometric Draft Controls
CONCO BUILDING PRODUCTS, INC., Brick, Tile, Stone,

CHICAGO TRAMRAIL, manufacturer of "Trak-Rak" Stacker Cranes, Monorail Systems, and "Fas-Lok" Storage Racks at 1330 S. Kostner Ave., Chicago, is now a DIVISION OF CONCO ENGINEERING WORKS, INC.

For more facts Circle 537 on Reader Service Card

To save time . . .
Every Tool Box Needs
a compact, easy-to-carry

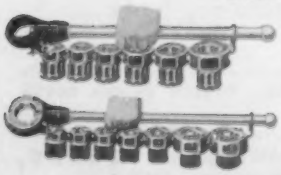
RIDGID®

Drop Head Threader Set

Snap a die head in the ratchet ring . . . cut your thread! It's as simple as that with a RIDGID drop head threader. Heads can't fall out . . . dies reverse quickly for close-to-wall threading. Finest quality RIDGID long wearing dies. Straight thread dies available.

Call Your Supply House!

Hand Carrier Free With All Sets Except No. 12-R
(Order in sets or any combination)



Exposed Ratchet Type
For pipe: ⅛" to 1"—00-R; ⅛" to 1¼"—111-R; ⅛" to 2"—12-R
For bolts: ¼" to 1"—00-RB

Enclosed Ratchet Type
For pipe: ⅛" to 1"—0-R; ⅛" to 1¼"—11-R

RIDGID
The Ridge Tool Company, Elyria, Ohio, U.S.A.

For more facts Circle 538 on Reader Service Card

Begins on page 233

CATALOG NEWS

For more data, circle item numbers you want on Reader Service Card.

terials, as well as parts and package handling. Covers system components. *Webster Mfg., Inc.*

36—Slings. Wire rope slings and swaged assemblies are discussed in 4-pager (No. 401). Includes rope-laid slings for wear resistance and cable-laid slings for flexibility. Lists terminals and fittings. *Brown & Perkins, Inc.*

37—Hand chain hoists. Featured in Bulletin ADH 76 (8 pages) is description of portable aluminum chain hoist in capacity ranges of ½ to 12 tons. Has Spiroid gear transmission. Includes specifications of other hoists. *Duff-Norton Co.*

PRODUCTION

38—Drilling, tapping units. Bulletin 6100 (32 pages) contains specifications, drill thrust charts, tapping-threading data, and typical circuits. Units are air- or hydraulic-powered. Applications show many uses. *Hypneumat, Inc.*

39—Burners. Design features, construction, operating principles, and advantages of Duradiant burners are covered in 20-page bulletin (DB-2). Types include burners for open firing, line arrangement, many others. *Selas Corp. of America.*

40—End mills, sinking cutters. This handy 36-pager (No. 661) describes company's complete line. Includes specifications; tables of dimensions and draft angles, charts. Cutaway drawings illustrate terms. *The Tomkins-Johnson Co.*

41—Pumps, accessory units. Catalog 42 (32 pages) describes air-powered equipment for materials-dispensing applications. Data on pumps, measuring valves, and other units. *Lincoln Engineering Co.*

42—Speed changers. Bulletin 51B9061B (4 pages) discusses increased productivity of machines,

Begins on page 233

CATALOG NEWS

For more data, circle item numbers you want on Reader Service Card.

processes, and systems through low-cost speed changers. Available in sizes to 30 hp. Details on assembly, photos. *Allis-Chalmers.*

43—Retaining Ring. This 24-page catalog (No. 61) presents information on retaining rings that save time, labor, and costs. Includes dimension tables, specifications, mechanical drawings, and photos. *Industrial Retaining Ring Co.*

44—Steel, carbide drills. Catalog 831 has 50 pages of information on drills, reamers, end mills, counterbores, tool bits, cut-off blades, countersinks, etc. Tables of dimensions, photos, useful numerical index. *Besley-Wells Corp.*

45—Grinding stresses. Here's a booklet, "Grinding Stresses: Cause, Effect and Control," that contains articles with information to help in a better understanding and use of residual grinding stresses. *Grinding Wheel Institute.*

46—Process control. This 8-pager (Ref. No. 4.20-1) provides data on feeding, weighing, blending, and proportioning equipment for control of liquids and solids in process industries. Photos, schematics of systems. *B-I-F Industries.*

47—Heavy-duty lathes. Bulletin HD-561 (16 pages) describes two models: Nos. 2516 and 3220 heavy-duty engine and tool room lathes. Designed for both heavy turning and delicate precision work. *R. K. LeBlond Machine Tool Co.*

48—Lubricating devices. Here's a 12-pager (No. 61) that covers automatic and chain oilers, dispensers, single and multiple valves, mist systems, other products. Engineering data, specifications, photos. *Trico Fuse Mfg. Co.*

49—Protective equipment. Catalog N-177 has 20 pages that describe personal protective equipment for welding and cutting. Photos and

Work Gets Done Faster with a

RIDGID®

TRISTAND VISE

on the job!

EASY TO FOLD
EASY TO CARRY
Extra Rigid in Use

Here's a solid workbench to speed all cutting, threading and reaming out on the job. No other vise offers as many work-saving features as this RIDGID No. 40-A Tristand Yoke Vise. • Big, rugged malleable vise base has 3 bending grooves, 6 tool slots, rear pipe rest and a ceiling brace screw for absolute rigidity if legs aren't bolted down. • Base overhangs front legs for clear tool swing. • Extra-large yoke latch opens for easy, fast insertion of long pipe lengths. • Replaceable LonGrip jaws give, slip-proof grip. • Handy tool tray locks legs open during use but folds for easy carrying with legs snap-chained together. RIDGID No. 450 Tristand Chain Vise with ⅛" to 5" capacity is also available.

Call your Distributor today. For your convenience, he maintains a complete stock of RIDGID Work-Saver Pipe Tools and parts.

RIDGID

The Ridge Tool Company, Elyria, Ohio, U.S.A.

For more facts Circle 539 on Reader Service Card

Choice of the wise buyer who compares...

CM HOISTS

CM METEOR ELECTRIC WIRE ROPE HOIST ½ to 5 ton capacities—Compact, enclosed design. Low headroom. Continuous duty motor with thermal overload protection for heavy duty service. Precision bearings and helical gears for long life. Only 110 volts at push button control. Hook suspension; plain, geared or motor driven trolley.

CM LODESTAR ELECTRIC CHAIN HOIST—⅛ to 2 ton capacities—First truly heavy duty version of small electric hoist. ¼ ton model weighs only 51 lbs. Heavy duty self-adjusting brake, plus exclusive regenerative electrical braking. Upper-lower safety limit switches. CM-Alloy load chain. Single and three phase.

HAND OR ELECTRIC CHAIN OR WIRE ROPE

CM makes them all! So you can choose a hoist that's perfectly suited to your specific needs in a compact, rugged and safe CM design.

CM TROLLEYS AND CRANES

CM CYCLONE Hand Chain Hoist—¼ to 10 ton capacities—Easy to carry. One ton model weighs only 36 pounds. Made of tough aluminum alloy. CM-Alloy load chain. High efficiency. Lifetime lubrication.

CM PULLER—"The One Man Gang"—¾ to 6 ton capacities—Lifts or pulls at any angle. Lever handle operation Automatic load brake holds at any point. ¾ ton model weighs only 14 pounds and fits in a tool box. CM-Alloy load chain.

● **FOR OVER 75 YEARS,** Chisholm-Moore has offered hoist buyers the newest and most efficient designs, the most rugged construction, and the greatest number of valuable operating and safety features. CM hoists operate with a very minimum of maintenance. They give years of satisfying service.

Request catalog and name of local stocking distributor.

CM HOISTS

CHISHOLM-MOORE HOIST DIVISION

COLUMBUS McKINNON CORPORATION

TONAWANDA, NEW YORK

REGIONAL OFFICES: NEW YORK, CHICAGO, CLEVELAND

In Canada: **COLUMBUS McKINNON LIMITED, ST. CATHARINES, ONTARIO**

For more facts Circle 540 on Reader Service Card

Begins on page 233

CATALOG NEWS

For more data, circle item numbers you want on Reader Service Card.

drawings show helmets, hand shields, goggles, safety glasses, etc. *NCG Div., Chemetron Corp.*

50—Wet blasters. Pressure-blast wet blasting shoots water and abrasive medium by compressed air. This 6-pager describes and illustrates several models of manually operated, stainless steel cabinets. *Pressure Blast Mfg. Co., Inc.*

ELECTRICAL

51—Synchronous motors. Bulletin 502 (10 pages) explains and illustrates features of low-speed motors in ranges from 20 to 10,000 hp. and from 72 to 450 rpm. Chart shows typical torque requirements. *The Ideal Electric & Mfg. Co.*

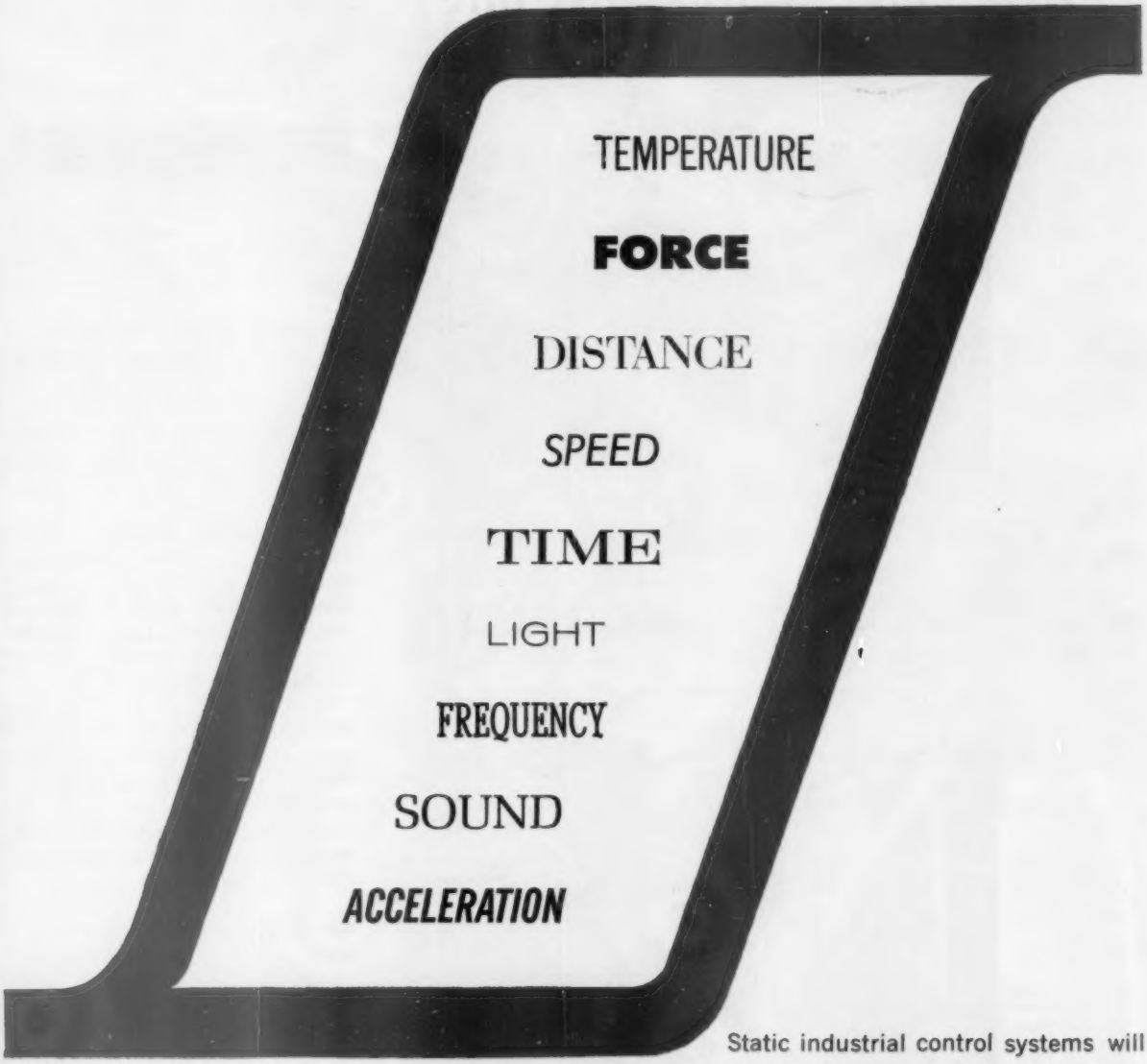
52—Proximity limit switch. It detects ferrous and non-ferrous materials without physical contact. Useful for sorting, counting, inspecting, and control of machine travel. All described in 4-pager GEA-7318. *General Electric Co.*

53—Emergency lighting. Technical descriptions of emergency lighting equipment are covered in this 8-page handbook. Includes batteries, chargers, relays, lamps, instrumentation lights, and switches. *The Electric Storage Battery Co.*

54—Cable support system. Big 52-pager (No. 106) tells and shows how to select and install components for supporting power, communication, automatic control, and other cables. *Chalfant Products Co.*

55—Floor boxes. New line of adjustable under-floor boxes and accessories is described and shown in 4-page bulletin (F13-144). Includes boxes for floors of shallow and normal fill, and for conduit up to 1¼ in. *The Thomas & Betts Co.*

56—Rigid PVC conduit. Non-conducting, non-corrosive PVC plastic conduit is listed by Underwriters'



Static industrial control systems will regulate virtually anything that is controllable — and under normal operation these *magnetic* systems will never break down, wear out or need servicing. Temperature (with precision to ±1/4°F at 2200°), position (with logic involving *and, or, not, memory* and *time delay*), speed, force, light, sound, acceleration, frequency, distance, field strength and pressure are but a few. ■ One manufacturer has replaced a vacuum tube-mechanical relay system on his high-speed assembly lines. Reason: it broke down every three weeks. The replacement magnetic static control system has now gone through 26,000,000 consecutive cycles without fault. ■ The symbol above, the magnetic hysteresis loop, , may encompass some of your control problems which are solvable at a lower overall cost. May we discuss this with you? Magnetics Inc., Department F-93, Butler, Pennsylvania.

INDUSTRIAL CONTROL EQUIPMENT

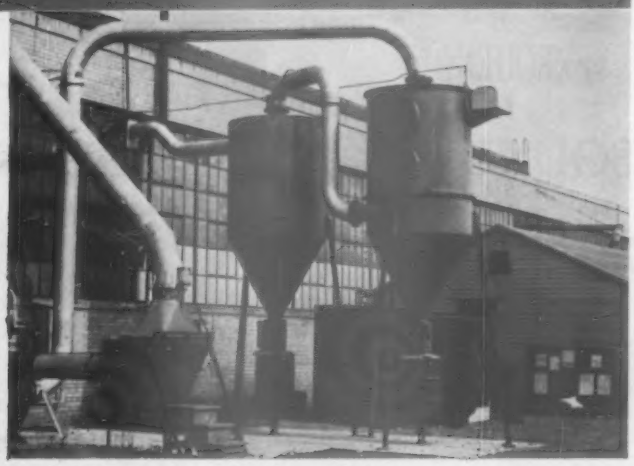
MAGNETICS inc.®

For more facts Circle 541 on Reader Service Card

CONTROLLING BERYLLIUM DUST

. . . Another Tough Task Made Easier and Safer by

SPENCER VACUUM



The Bendix Corporation, Eclipse-Pioneer Division

Toxic nature of its dust makes beryllium a "problem" metal to machine. But not here!
Spencer vacuum, piped into a specially designed "clean room", picks up the dust right at the machines . . . whisks it away to filter-equipped separators outside the building.
Result: machining is quicker, safer, easier.

Request Catalog No. 155B, "Spencer Vacuum", or write for recommendations on your particular problem.

Also manufacturers of portable vacuum cleaners and pneumatic conveying systems.

The SPENCER TURBINE COMPANY
HARTFORD 6, CONNECTICUT

Begins on page 233

CATALOG NEWS

For more data, circle item numbers you want on Reader Service Card.

Laboratories for burial underground or in concrete. Brochure (8 pages) lists sizes, shapes, fittings. Photos. *Lasco Industries.*

57—Pump motors. Two groups of a-c pump motors are listed in 6-pager (L-4121A): jet pump, 56-frame motors, from ¼ to 2 hp.; close-coupled, 182 to 254U frames up to 10 hp. All standard voltages and frequencies. *Kingston-Conley.*

58—D-C power supplies. Bulletin PS-561 covers 14 low voltage, regulated, semi-regulated, and conventional d-c power supplies. Guide to selection of models. Lists characteristics and performances. *Electro Products Laboratories, Inc.*

59—Survey service. Electrical power surveys, high potential testing, location of ground faults, and other services are detailed in an 8-page brochure. Service includes recommendations to improve power usage. *Electrical Surveys, Inc.*

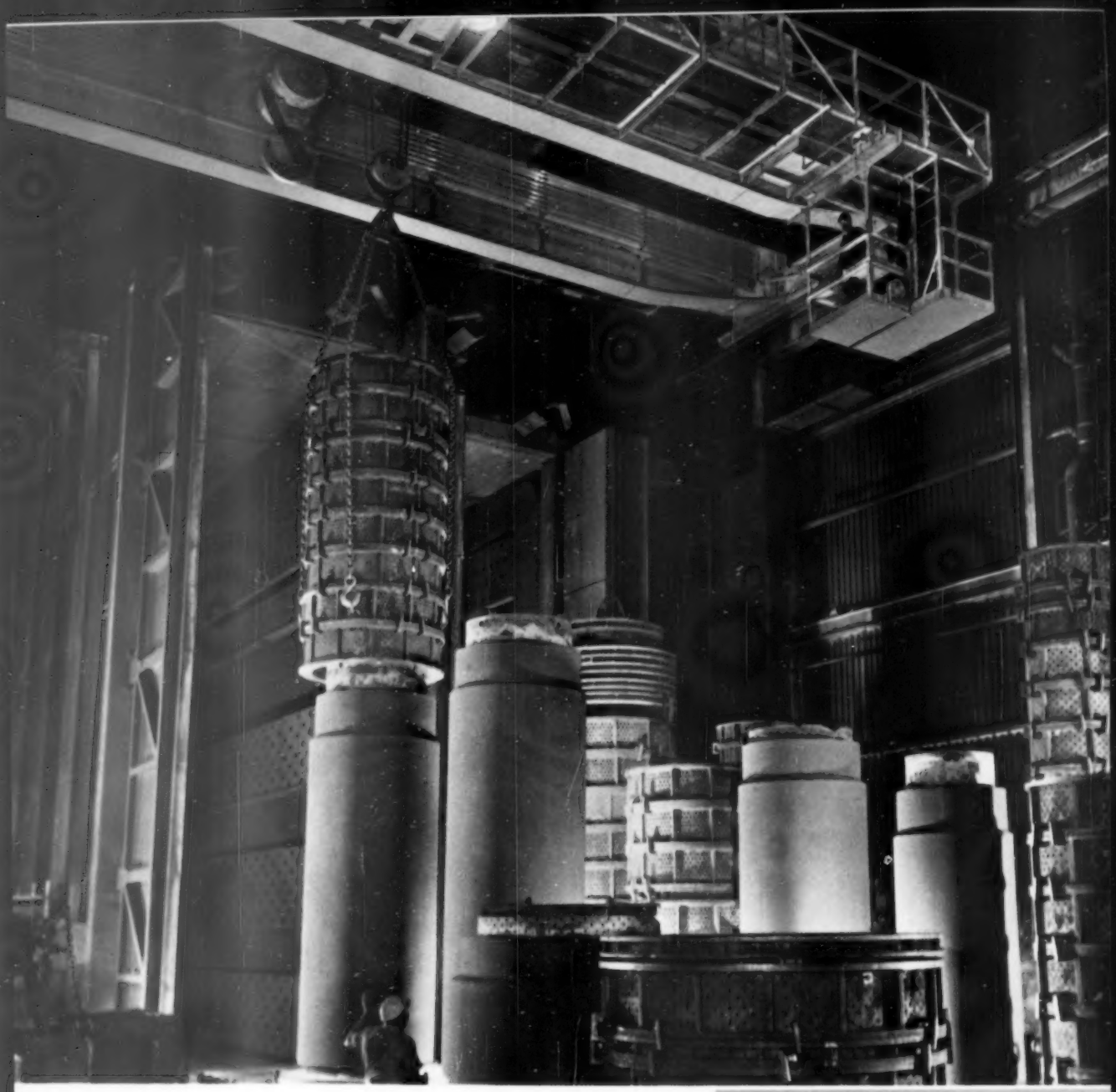
60—Silicon rectifiers. Specification Sheet 145.15 (8 pages) includes 19 curves on cell specifications, maximum circuit ratings, and recurrent overload ratings keyed to NEMA standards for rectifiers below 100 kw. *General Electric Co.*

61—Wiring conduit. Flexible liquid-tight conduit has galvanized steel core, including copper ground and polyvinyl chloride cover. This 4-pager (No. S-544) describes construction, lists specifications. *Anaconda Metal Hose Div.*

62—Power supply centers. Bulletin 2469 (4 pages) tells about new packages of three-phase load-center transformers, high- and low-voltage terminal compartments, and cable entries for underground feeders. *McGraw-Edison Co.*

63—Speed reducers. File folder includes 8-page brochure describing Hi-Range reduction drives. Claimed

Turn to page 248



FOR EVERY APPLICATION, THERE'S ONE CRANE OUTSTANDING . . . P&H!

This P&H overhead crane handles these tall foundry flasks and huge, yet agile, cores as gently as a mother lifts baby. With P&H Electronic Stepless control, in combination with P&H Magnetorque braking, the operator performs all the work of assembling flasks and cores smoothly, precisely, confidently—every time. Result: maximum production with *zero* damage.

You get this kind of performance only from a perfect marriage of operating and control characteristics . . . something Harnischfeger guarantees. Harnischfeger is the only crane manufacturer that makes . . . and matches . . . all electrical as well as mechanical components. And because we *make* all the parts, rather than *buy* and *assemble* them, your cost is agreeably low!

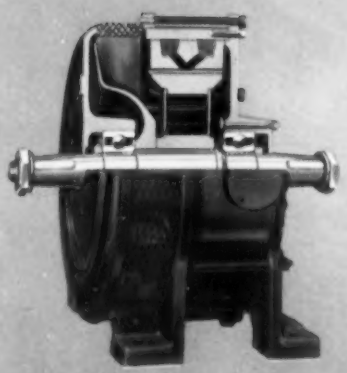
Next time *you* need any size overhead crane, send your inquiry to the world's largest crane builder: Harnischfeger, Milwaukee 46, Wisconsin.

HARNISCHFEGER P&H

Milwaukee 46, Wisconsin

OVERHEAD CRANES

Offices in major cities... see Yellow Pages



Cutaway view of P&H electric load brake... heart of P&H Magnetorque Control... which consists of a simple, indestructible rotor and stationary field through which braking forces are exerted electromagnetically.

P&H HEVI-LIFT® HOISTS

handle steel plate with a feather touch!

P&H Balanced Design Hevi-Lift hoists handle steel plate and welded structures in this metal-fabricating plant with precision and safety. Eight-push-button, variable-speed control permits the operator to handle even the largest, most awkward sheets quickly, accurately, safely.

The P&H hoists are mounted on single-leg gantries to provide complete 3-dimensional range of movement. In effect, they operate as junior-sized overhead cranes in this particular area of the plant. They are designed to work with the big P&H overhead cranes — seen in the background — that serve the entire plant.

Every part of the Balanced Design hoist has been balanced or matched with every other part for maximum strength, temperature, and performance characteristics. Important in a plant like this? You bet! You'll find Balanced Design Hevi-Lifts stand up far longer under heavier duty cycles, and with less maintenance, than any other hoist made today.

Find out more about these outstanding hoists. Write for bulletin H-55. Dept. 238, Harnischfeger Corporation, Milwaukee 46, Wisconsin.

HARNISCHFEGER

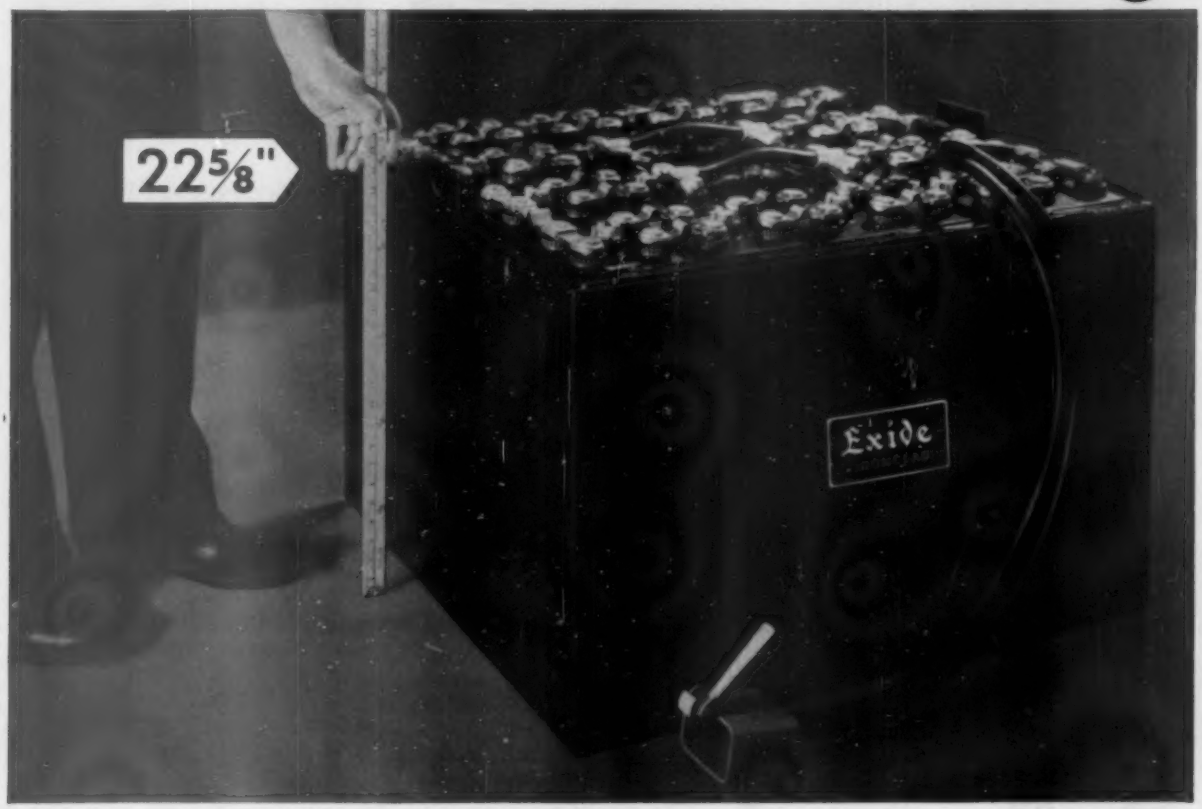
Milwaukee 46, Wisconsin

P&H
ELECTRIC HOISTS

Offices in major cities... see Yellow Pages

EXIDE POWER PACKAGE

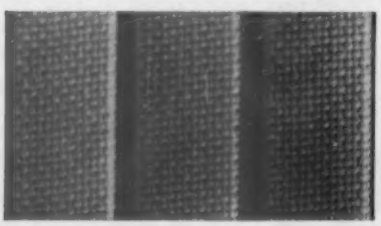
Exide Industrial Marketing Division, The Electric Storage Battery Company, Philadelphia 20, Pa. (ESB)



85 AMP-HR—ONLY 22⅝ in. HIGH!

Here's the new high in battery capacity for electric industrial trucks—the Exide-Ironclad TSC Battery. It is available right now and it will fit in the battery compartments of your present trucks without modification. It conforms to the design thinking for future trucks as expressed by truck manufacturers.

This battery offers a capacity of 85 amp-hr per positive plate—increased from the previous highest available capacity of 80 amp-hr in the Exide-Ironclad TGS—and still with over-all height of 22⅝ in. The length and width dimensions of the battery are also unchanged. Therefore the new battery occupies the same space as present batteries.



New tubing boosts battery capacity

Side view of tubing magnified twice size shows the fine mesh with thousands of pores for easy flow of electrolyte. Holds active material firmly against loss.

A unique feature of the Exide-Ironclad Battery is the tubular construction of the positive plates. With the square-shaped tube, introduced over a year ago in the TGS Battery, Exide made it possible to get higher capacity from each positive plate through greater area in contact with the electrolyte.

Now, in the TSC Battery, Exide introduces woven mesh tubing, still square shaped, but with higher porosity for easier access of electrolyte. This new tubing is able to hold more active material, which, in addition to the higher porosity, results in higher capacity than ever before. The tubing is of a special nonoxidizing material of proven long life in extensive laboratory tests and field applications.

This increase in battery capacity has been achieved without increasing the height of the battery. Thus you can step up the work capacity of your present trucks without the extra expense of modifying the battery compartments. The Exide-Ironclad TSC is still only 22⅝ in. high. Likewise its specific gravity is still only 1.275. Hence battery life potential remains high.

With the introduction of the Exide-Ironclad TSC, Exide now makes it possible for you to match your particular battery power requirements more closely than ever. If you are ready to buy a new truck or new battery now, talk with your Exide representative about how you can get the maximum power for your dollar.

Only Exide offers so broad a range of battery types: Exide-Ironclad, Exide-Powerclad premium flat plate, and Exide Nickel-iron alkaline (invented by Thomas A. Edison). Exide chargers are available in both motor-generator and silicon rectifier types, in sizes to cover all needs. Exide service men are coast to coast, all factory trained in both batteries and chargers.

Make sure you get maximum economy in your battery power. Write Exide Industrial Marketing Division, The Electric Storage Battery Company, Philadelphia 20, Pa.

Exide®

For more facts Circle 544 on Reader Service Card

For more facts Circle 545 on Reader Service Card

★ SUITABLE SITES

- Ready availability of primary and fabricated metals, and metal products.
- Low basic freight rates. Wider coverage with rates and routes than is generally obtainable.
- First or second morning delivery to principal Lake Erie ports . . . second morning to New York, Chicago, and St. Louis markets.
- Non-metropolitan costs for labor, taxes, utilities, and other operating overhead.
- Technical assistance available at over 20 outstanding research centers.
- Superior cultural, educational, and recreational facilities.
- One of America's great concentrations of population and purchasing power within 125-mile radius.

Phone or write E. J. Smith, Jr.
Manager of Industrial Development
P. O. Box 536, Pittsburgh 30, Pa.
ATlantic 1-4780

BESSEMER

BESSEMER and LAKE ERIE RAILROAD CO.
INDUSTRIAL DEVELOPMENT DEPARTMENT
182 FRICK BUILDING, PITTSBURGH 30, PA.
THE BESSEMER MAN IS AT YOUR "SITE SERVICE"

Begins on page 233

CATALOG NEWS

For more data, circle item numbers you want on Reader Service Card.

to be 40% to 60% smaller than other reducers of comparable ratings. Ratios up to 174 to 1 in single-stage reduction. *Black Tool, Inc.*

64—Semiconductors. Bulletin No. 200, 8 pages, explains company's 18-month guarantee of its semiconductor devices. Photo flow chart highlights quality checks in manufacturing. *Syntron Co.*

BUILDING

65—Lightweight door. Overhead translucent door is made of fibrous glass panels and aluminum frame. Weight of 24- by 16-ft. size is approximately 500 lb. Brochure (4 pages) describes features, lists sizes. Diagrams. *Frantz Mfg. Co.*

66—Siding, roofing. Ceramic on steel comes in standard sheet sizes, in a variety of profiles, gauges, colors. Catalog (4 pages) has data and schematic showing erection technique. *Caloric Appliance Corp.*

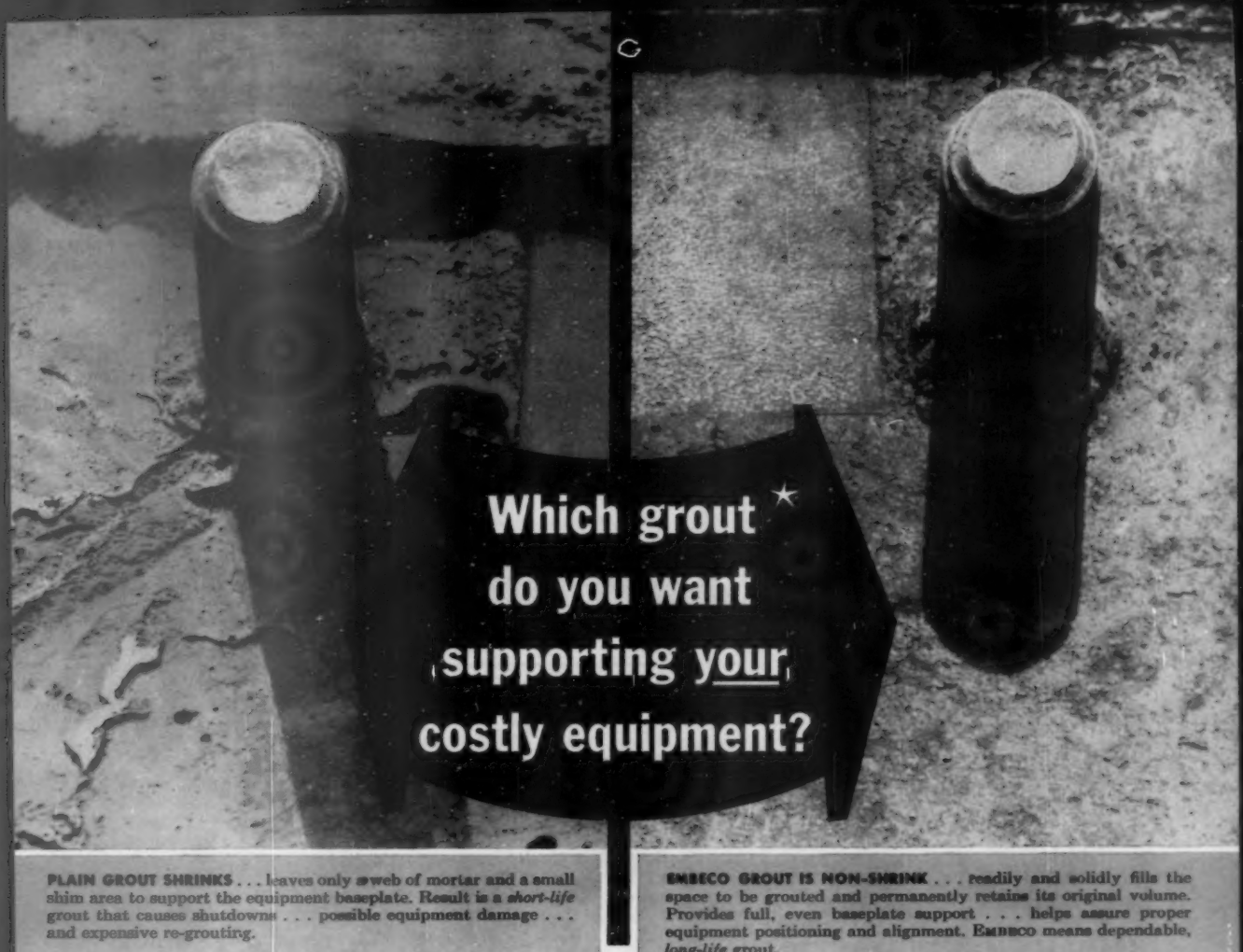
67—Recessed luminaires. Fluorescent lighting fixtures are described in illustrated Booklet B-8235 (10 pages). Explains installation, operation features, lists types (wide flange, grid, and T-bar), sizes. *Westinghouse Electric Corp.*

MAINTENANCE

68—Fire equipment. Brochure P-67, 12 pages, describes portable fire extinguishers, smoke and fire detectors, and carbon dioxide systems. Chart shows types of extinguishers suitable for three classes of fires. *Walter Kidde & Co., Inc.*

69—Lubrication systems. Direct, single line, dual line, oil circulating, and constant pressure lubrication systems are discussed in 36-page catalog. Lists specifications, and explains operation of units. *Research Appliance Co.*

Turn the page



Which grout ★ do you want supporting your costly equipment?

PLAIN GROUT SHRINKS . . . leaves only a web of mortar and a small shim area to support the equipment baseplate. Result is a *short-life* grout that causes shutdowns . . . possible equipment damage . . . and expensive re-grouting.

EMBECO GROUT IS NON-SHRINK . . . readily and solidly fills the space to be grouted and permanently retains its original volume. Provides full, even baseplate support . . . helps assure proper equipment positioning and alignment. EMBECO means dependable, *long-life* grout.

Today's figures show that *machinery* for the average U. S. factory costs $4,680,000[1] — a sizeable, important investment geared toward smooth, efficient production. But the *grout* under this valuable equipment *costs only pennies* by comparison.

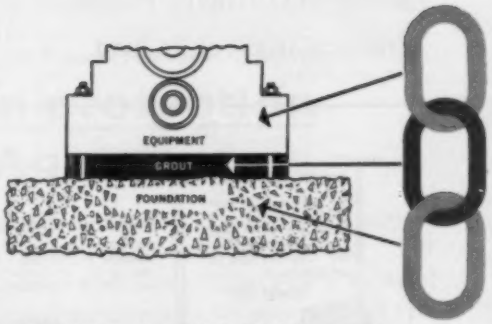
Compare the grouts pictured above. It's clear evidence that EMBECO can save *you* costly re-grouting and production downtime.

Here's why EMBECO means a superior grouting job every time—

- **Non-Shrink** . . . assures tight, level, permanent contact with equipment baseplate.
- **Flowable** . . . quickly, completely fills the space, increases ease of placeability.
- **Strong and Tough** . . . withstands impact, pounding action, vibration, side thrust and torque . . . maintains perfect alignment.

Before *you* grout another piece of heavy equipment—call in the local Master Builders field man for full information, or write to us for details on how EMBECO can help you *grout for good.*

[1]*U.S. average*—initial *machinery and equipment costs for* new *factories.*



★**GROUT** . . . is the "vital link" between equipment and foundation.

The Master Builders Company • Cleveland, Ohio
Division of American-Marietta Company
World-wide manufacturing and service facilities

Our 50th Year

MASTER BUILDERS®
EMBECO*

*EMBECO *is a registered trademark of The Master Builders Co. for its specially-prepared, flowable, non-shrink grouting products.*

E-2006

For more facts Circle 547 on Reader Service Card

RED GIANT: *Rugged, Dependable— Year after Year*

Red Giant Hand Lift Trucks are available in eight basic models and with a range of sizes and capacities in each model.

Tremendous strength without excessive weight, all steel construction, electric arc welded members, long bearing surfaces, and most of all, the simple and correct design, enable these Red Giant Lift Trucks to stand up under constant use—even abuse—year after year.

Smooth operation, a non-kicking, spring-balanced handle for complete safety—these are some of the features which make RED GIANT the most practical truck of its kind.

INDEX No. 51.15
Red Giant Model K. Job tested handling skids of building materials on sky-scraper construction projects. Capacity 1500 lbs. Hydraulic lowering check.

INDEX No. 51.13
Red Giant Model J for movement of skids. Two stroke mechanical lift eases effort required to lift load. Capacities 2500 lb. and 4000 lb.

INDEX No. 51.14
Red Giant Model S fully hydraulic lift and lowering. For movement of skids. In capacities of 2500 lb. to seven and one half tons.

INDEX No. 51.21
Red Giant Model JKT for handling single faced pallets. Mechanical lift and hydraulic lowering check. Capacities 2500 lb. and 4000 lb.

INDEX No. 51.22
Red Giant hand lift truck for two or three ton loads on two faced pallets. Fully hydraulic lift and lowering. Capacities 4000 lb. and 6000 lb.
Model SVP

INDEX No. 51.12
Red Giant Model H hand lift truck for movement of skids. Single stroke mechanical lift with hydraulic lowering check. 2500 lb. and 4000 lb. capacities.

INDEX No. 51.22
Red Giant H2½VP fully hydraulic lift and lowering for two faced pallets. Separate pump handle for lifting in limited space. Capacity 2500 lbs.

REVOLVATOR CO.

ESTABLISHED 1904

Designers and Manufacturers of Portable Elevators, Power and Hand Lift Trucks, Hydraulic and Traction Elevators, Carboy and Barrel Dumpers, Portable Cranes, Positioners, Storage Racks, Turntables and Other Material Handling Equipment.

8761 TONNELE AVENUE
NORTH BERGEN, NEW JERSEY

Sales Representatives in Leading Centers

For more facts Circle 548 on Reader Service Card

Begins on page 233

CATALOG NEWS

For more data, circle item numbers you want on Reader Service Card.

70—Scaffolds. Standard interchangeable parts, including casters, are used to make various sizes and types of scaffolds. Sizes start with 4 ft. height, 7 ft. width; can be extended with additional components. *Universal Mfg. Co.*

71—Air cleaners. Dust collectors and oil mist precipitators are described in two 4-page bulletins (Nos. 180, 240). Dust collector is involute cyclone type. Electrostatic precipitator removes oil mist and smoke. Photos. *John Wood Co.*

AUXILIARY

72—Fans. New SQ Airfoil fans are presented in 12-page bulletin (ASQ-102). Data on design features; mechanical efficiency diagrams; selection tables for each size. *Chicago Blower Corp.*

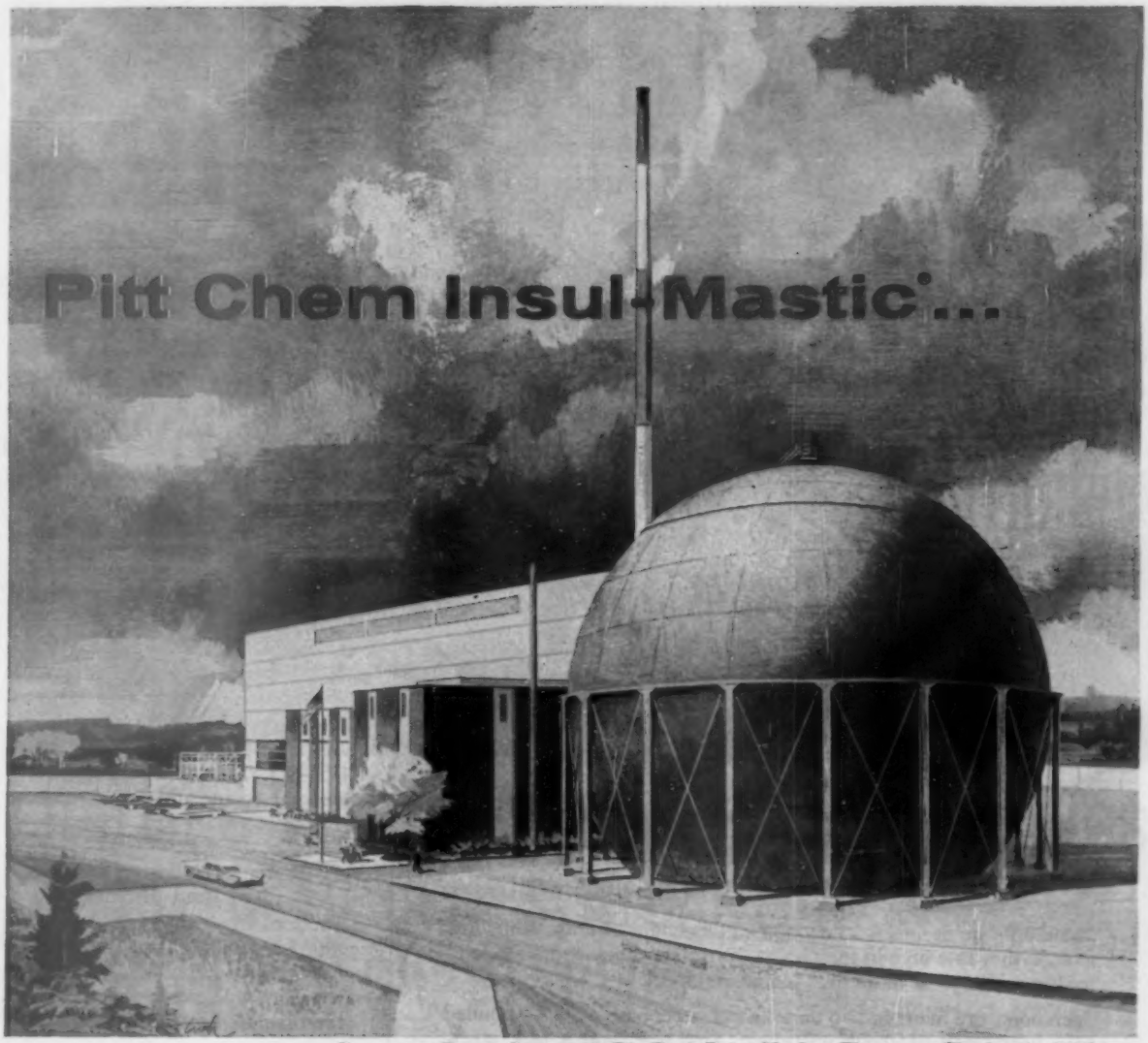
73—Centrifugal pumps. Single-stage, double-suction, horizontal split-case pumps are described and illustrated in Bulletin 105C (8 pages). Capacities range to 6000 gpm., heads to 380 ft. Has selection charts. *New York Air Brake Co.*

74—Heating and cooling. Bulletin No. 356 (24 pages) discusses heating, cooling, and heat transfer based on the use of Panelcoils—joined metal sheets, one or both formed with flow channels. Engineering data. *Dean Products, Inc.*

75—Coal-fired boiler. Unit combines boiler, stoker, combustion control system, coal and ash conveyors. Described in 6-pager which covers features, sizes, operating diagram. *Canton Stoker Corp.*

76—Gas regulators. Catalog 806 (40 pages) discusses regulators and accessory equipment for control of industrial gases. Covers regulators for cylinders, manifolds, pipeline outlets. Includes selection charts. *Air Reduction Sales Co.*

Turn the page



Consumers Power Company's Big Rock Point Nuclear Plant near Charlevoix, Michigan

insulation and corrosion protection for the Atomic Age

Providing corrosion protection and insulation for a nuclear containment vessel was a new assignment for Pitt Chem, one that demanded topflight results in both requirements. Because of its service-proven history in solving dual-purpose coating and insulating problems, Pitt Chem Insul-Mastic 553 was specified for use on this nuclear energy plant presently under construction.

Insul-Mastic 553, Gilsonite asphalt insulating mastic is a tough, durable coating containing a high percentage of granulated cork. With 553 you get a high degree of thermal insulation and excellent condensation corrosion control with a *single* coating.

Pitt Chem Insul-Mastic 553 solves dual-purpose insulation-corrosion problems effectively and . . . at significantly lower cost. Consult the Yellow Pages of your local telephone directory for your nearest Pitt Chem Distributor; and while doing so, ask him about Pitt Chem's complete anti-corrosion service. 3764

•

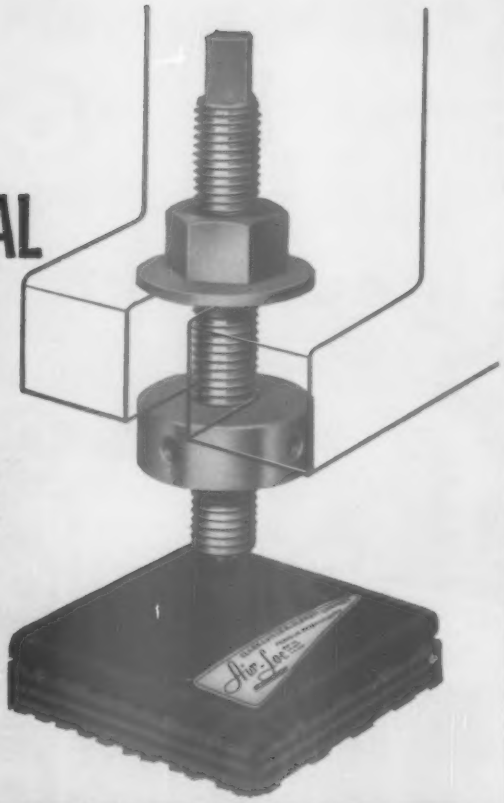
PROTECTIVE COATINGS DIVISION

PITTSBURGH CHEMICAL CO.

GRANT BUILDING PITTSBURGH 19, PA.

A Subsidiary of PITTSBURGH COKE & CHEMICAL CO.

THE ECONOMICAL APPROACH TO VIBRATION CONTROL



JACMOUNT

MACHINE MOUNTS

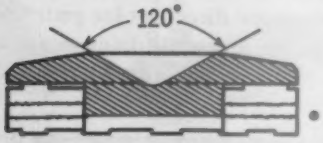
Jacmounts are designed for economy in machine mounts. While low in cost, they rate high in their ability to isolate shock and noise, and to dampen 85% or more of machine vibration.

Jacmounts are made in two units: a cast steel base plate — bonded to a heavy pad of shock absorbent Air-Loc®; and a jack screw assembly for accurate leveling. The base plate is recessed with a 1¼" diameter cone-shaped depression to accommodate the screw.

Jacmounts are easily installed, requiring no bolting or cementing.

BUY ONLY WHAT YOU NEED FOR YOUR MACHINES

Many machines already have jack screws furnished as original equipment. In this case, you buy only the base plate. Its conical recess has an included angle of 120° to take a wide range of screw diameters. If your machines are without jack screws, you buy the complete unit.



Conical recess will accommodate a wide range of screw diameters.

In either case, you'll get a mount of excellent stability and performance.

Jacmounts are adaptable to your mounting requirements. Call your local Air-Loc distributor now, or write for complete information.

Air-Loc® DIVISION

Clark, Cutler, McDermott Co.

105 WEST CENTRAL ST. • FRANKLIN, MASS.

Begins on page 233

CATALOG NEWS

For more data, circle item numbers you want on Reader Service Card.

78—Gas heaters. This Handbook (GN-200, 8 pages) tells about application of direct-fired gas heaters for general space heating, heating for loading door areas and entries, make-up tempering, combination heating-cooling. Photos, diagrams. *Reznor Mfg. Co.*

79—Fans. AMCA standard Class 1 and Class 2 fans are described in 48-page Bulletin A-1401. It covers 15 sizes of single-inlet, single-width design, and 12 sizes of double-inlet, double-width design. *American-Standard Industrial Div.*

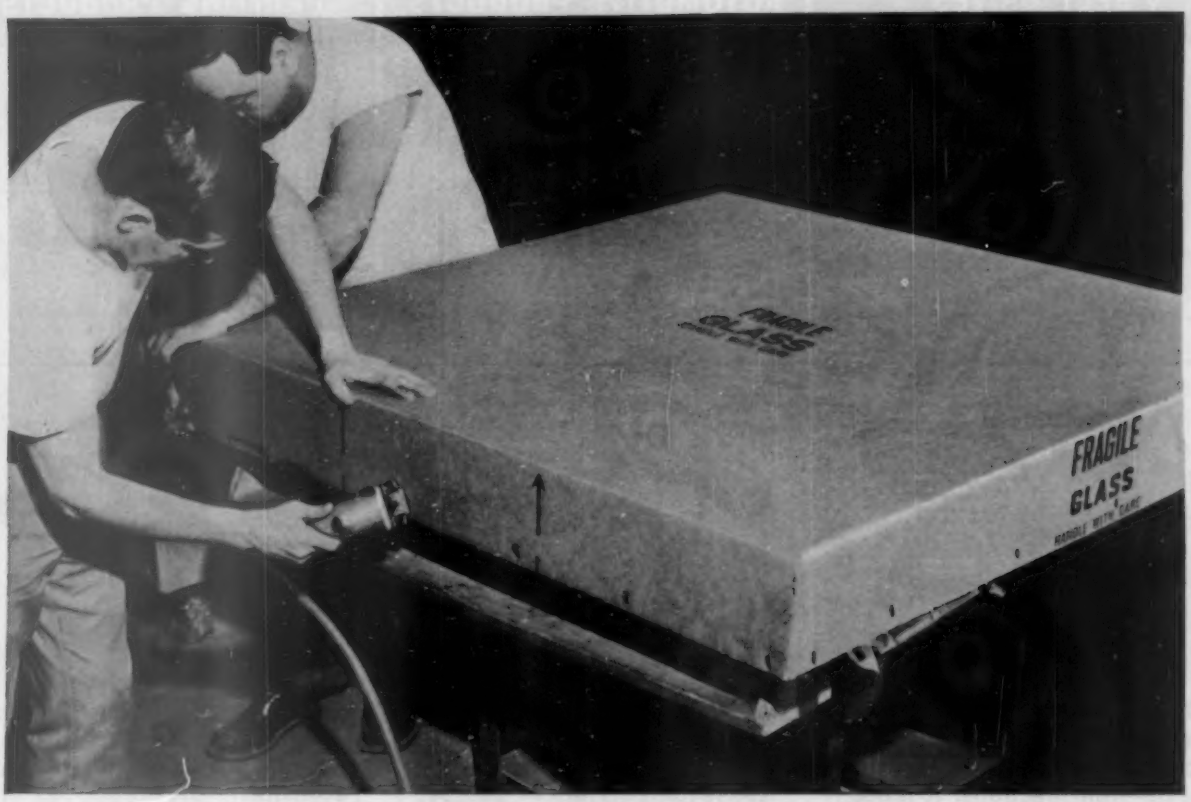
80—Heater sections. Equipment for air-conditioning preheaters, fresh air supply, process and drying applications, is presented in 12-pager (IFB-61). Data includes specifications for steam and hot water use. *L. J. Wing Mfg. Co.*

81—Water heaters. Dimensions, specifications, and alternative construction materials of tank heating units for volume water heating are given in 4-page bulletin (No. 4000-E). Has guide to size selection. *American Tube & Controls, Inc.*

82—Centrifugal pumps. Bulletin 722.6 (8 pages) describes grease- and oil-lubricated models of two-stage centrifugal pumps in capacities to 3000 gpm. and heads to 1000 ft. Includes working pressures, dimensions, etc. *Gould Pumps, Inc.*

83—Fume control. Here's a 6-page bulletin (No. 924) that explains how new exhaust hood, combined with synthetic-fabric dust collector, eliminates electric furnace smoke and fumes. Shows applications emphasizing hood placement, and other features. *Pangborn Corp.*

84—Compresors, engines. Engine and motor-driven compressors, power and expansion engines, jet-powered gas turbines, control systems are presented in Bulletin 100 (14 pages). Includes application photos. *The Cooper-Bessemer Corp.*



LIGHTING FIXTURES SHIPPED AT SAVINGS OF 35 TO 40 CENTS A CARTON WITH BOSTITCH® STAPLING

This manufacturer of fluorescent lighting fixtures uses Bostitch stapling for packaging large commercial and industrial fixtures up to four feet square. Air-driven Bostitch staplers are used to assemble top and bottom halves of the 275-lb. test telescope containers ranging in size from two to four feet square. The same Bostitch machine is used to make four corner inserts for each box to hold contents in place. Containers are then closed with air-driven Bostitch stapler using self-clinching staple.

Stapling has been found to be at least 25% faster than the old method and costs have been reduced from 35 to 40 cents a carton. Another advantage of stapling has been the increase in strength for better "stacking ability."

To get the facts on the benefits possible from the use of stapling, call your Bostitch Economy Man. He's listed in the phone book. Ask for his analysis of the cost and speed factors in your shipping operation. He may be able to point out similar savings for you.

Only three staples are necessary in each corner to assemble both the top and the bottom sections of telescope corrugated cartons with the Bostitch T21 Plier.

Fasten it better and faster with

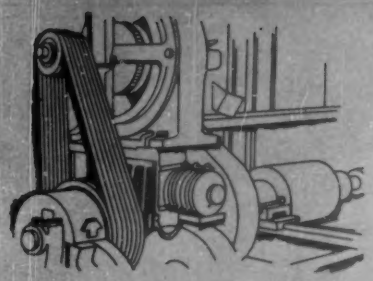
BOSTITCH®

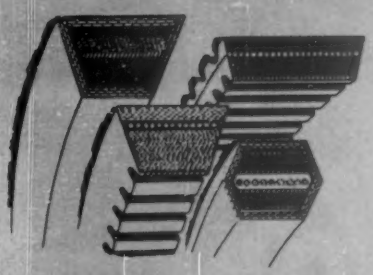
STAPLERS AND STAPLES

611 BRIGGS DRIVE, EAST GREENWICH, R. I.

For more facts Circle 551 on Reader Service Card

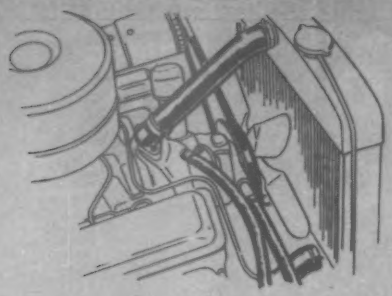
V-BELT DRIVES





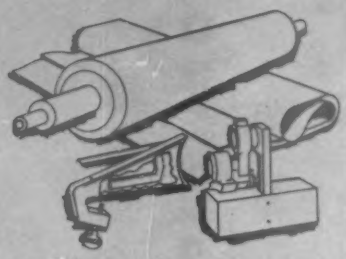
Dayco offers the only complete line of V-Belts in the industry for every power transmission need—from fractional to 1,000 and more horsepower.

AUTOMOTIVE PRODUCTS



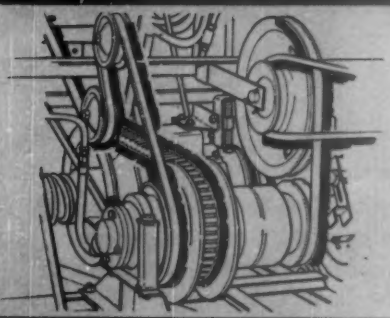
Dayco provides a complete line of Fan Belts, Radiator Hose, and other rubber products for passenger cars, trucks, busses, and tractors.

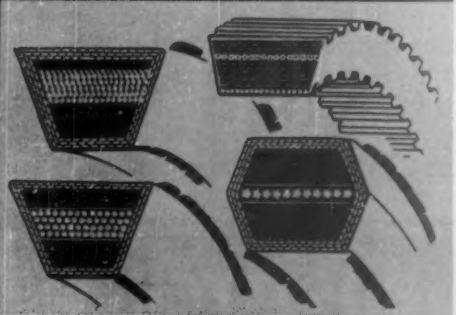
PRINTING PRODUCTS



Dayco offset and letter press rollers, Gold Seal offset Blankets, Color Separators and Fountain Dividers, for all makes of presses.

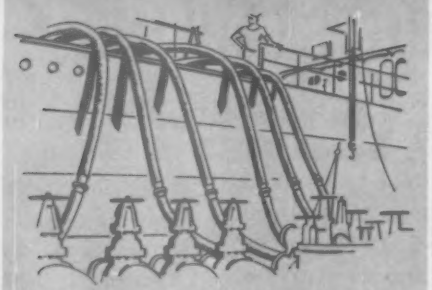
AGRICULTURAL V-BELTS

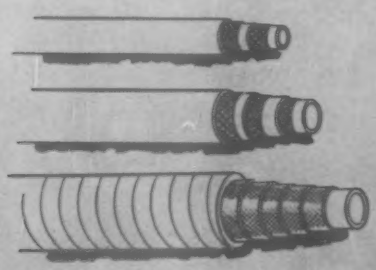




Dayco builds specialized V-Belts for the efficient transmission of power on all types of traction, propulsion and auxiliary farm implement drives.

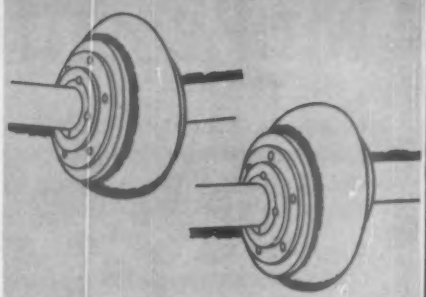
INDUSTRIAL HOSE

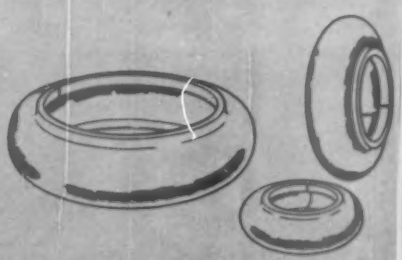




Dayco offers molded and horizontal braided, machine and hand wrapped fabric, and woven jacket constructions for all industrial applications.

MOLDED RUBBER





Dayco custom-engineered molded rubber, rubber-to-metal and rubber-and-fabric components for mechanical applications.

Dayton

Take your pencil. Get all the Dayton literature from your files. Make one little change. In place of Dayton write Dayco.

From now on, that's our product name. **Dayco** V-Belts. **Dayco** Hose. **Dayco** Printing Rollers and Blankets. **Dayco** Molded Rubber. **Dayco** Agricultural and Railway Drives.

Thus ends the difference between our corporate name, Dayco and our **former** product name, Dayton.

Let us repeat. The only thing that's changed is the name. The same high quality. The same broad line. The same friendly, helpful people. Only their product line is now **Dayco. DAYCO. D-A-Y-C-O.**

Dayco CORPORATION

Rubber Products Division — Melrose Park, Illinois

(Formerly known as The Dayton Rubber Company)

LABOR RELATIONS CLINIC

With Noted Labor Lawyer Paul King

Practical advice on labor problems bothering FACTORY readers. Then, on the following pages, comments on current labor developments.

Q. **Promotion procedure** under our union contract permits us to promote junior employees more skilled than their seniors. But does the junior employee actually have to file for the job? Can't management just pick him? *L. R. S., Supervisor.*

A. Unlike a frat rush, no matter how much ability a junior man may have, you can't just tap him for the job and let it go at that. Not if the contract calls for job posting and bidding. But this question doesn't pop up very often because, somehow, in the average plant, tapped employees always seem to bid for the job—on time, too.

Q. **The company is required to consult with the union** as to a course of action under several clauses of our union contract. We can't even change shift hours unless we consult with the union. Our labor relations department won't close a window without union "approval." What does the word "consult" mean in a union contract? *P. K., Foreman.*

A. Let's start from scratch. When a course of action must be approved by the union before you can go ahead, the clause generally says that union and management must "agree." At the other extreme, if nothing is said, you can do what you please within the limitations of the clause—unless you must "notify" or "consult" with the union. To "notify" the union is to tell them in advance what you plan to do—and then you can feel free to do it. Between "agree" and "notify" lies the word "consult." It means to tell the union what you are planning to do, and then to try hard to get agreement on the planned action. But if, after a good try, you don't succeed, you can still plunge ahead—if you dare.

Q. **Can an employee be fired** for being incompetent on one occasion? *J. S., Shop Foreman.*

A. An employee can be fired for any reason—and for no reason. The question is whether the union and the arbitrator will let you get away with it. A single instance of incompetence, without a history of warnings to the employee, generally is not enough. Arbitrators like to see a record of "working" with the employee to help him improve, and a history of incorrigible incompetence. Then the sack should hold him.

Q. **All the big contract issues** are settled at headquarters. Not only does the New York staff negotiate wages and the key issues of our plant contract, but what they agree upon in the city seems always to follow the pattern set by the industry's giants. At the plant, we are limited to such issues as seniority, work standards, incentives, and so on. Where is all this plant autonomy we hear about? *R. L. G., Personnel Manager.*

A. You didn't hear about it from us. There's no question about the big fellows setting the pattern in the areas you describe. But there's no question, either, about the importance of the areas carved out for plant jurisdiction. Recently, the Babson Institute of Business Administration found (with government money) that small employers feel that the areas for plant bargaining you mention have a strong bearing on flexibility and unit costs, and are areas crucial to company survival. There are no small parts in this play—only small actors.

Q. **How good is a verbal agreement with the union?** *K. L., Labor Relations Supervisor.*

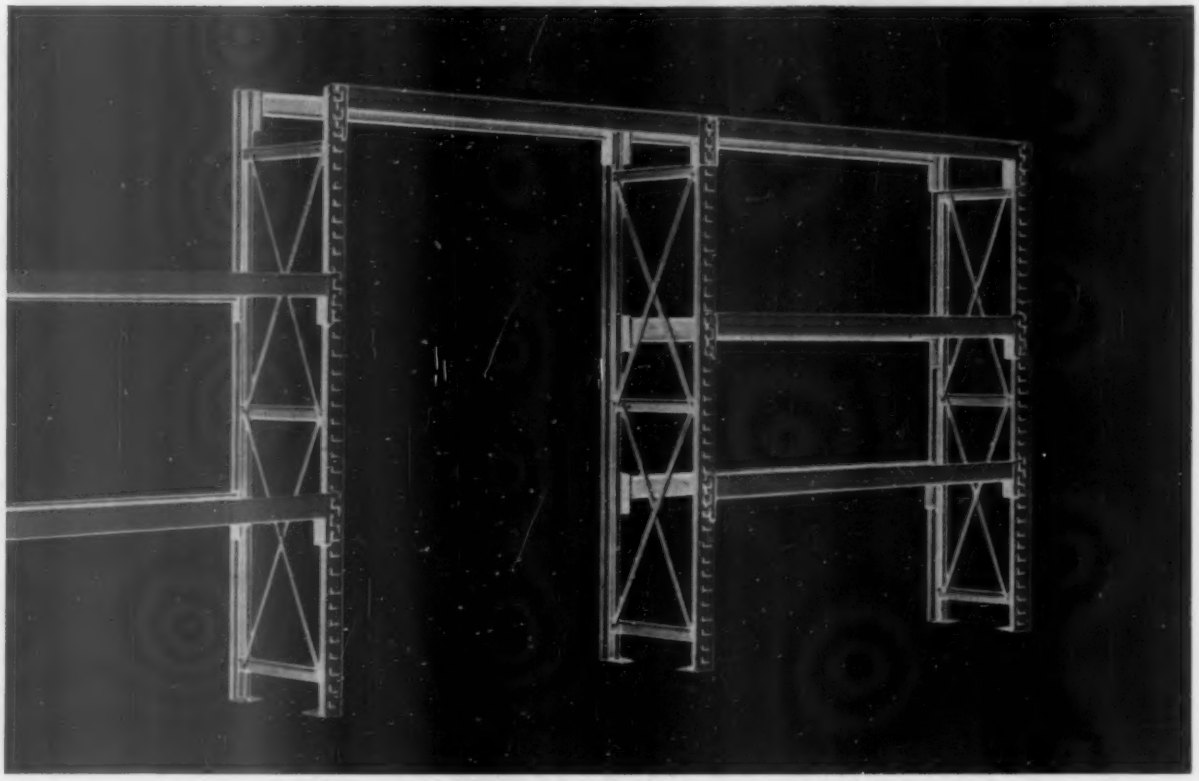
A. About as good as a verbal agreement with a landlord to paint your house before the lease is up. If he comes through, the agreement was good. If he doesn't, try and sue him. Written contracts with the union can be legally amended orally (if there is no language in the contract specifically saying no), but the big rub is how to prove what the parties agreed to. Play it safe and put it in writing.

Q. **Our labor contract prescribes a time limit** for the filing of grievances, but we have been processing them even where they have been filed after the deadline. Can we now clamp down? *C. N., Plant Superintendent.*

A. "If the agreement does contain clear time limits for filing and prosecuting grievances, failure to observe them generally will result in a dismissal of the grievance if the failure is protested. . . . Time limits may be held waived by a party in recognizing and negotiating a grievance without making clear and timely objection." (Authors Elkouri and Elkouri in *How Arbitration Works.*) Their conclusions were based on actual arbitration awards. In your case, this would mean (a) tell the union in writing that after such and such a date, the company will

Each month Paul King will answer labor relations questions of general interest. No replies will be made other than those published. Write Mr. King, FACTORY, 330 West 42nd St., New York 36.

PALMER-SHILE UNVEILS the standard series 75

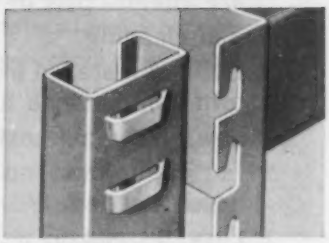


. . . AVAILABLE FROM STOCK AT LESS COST

Here's the biggest news in the materials handling industry in years. Production of the Standard Series 75 storage rack now makes it possible for you to order the finest rack system available . . . *from stock*. The new Palmer-Shile Standard Series 75 storage rack fulfills *more* requirements in a *more* superior manner than any rack in Palmer-Shile history. There's a range of 16 potential rack sizes to choose from—including a one-shelf-high rack.

The Standard Series 75 has the familiar Palmer-Shile characteristics which have made the custom Series 75 the talk of the industry: uniqueness, adjustability, versatility and strength. There's no metal removal in the construction of uprights. All uprights are sway-braced at the factory. Locks are cold formed from the material itself. Each rack adjusts on three-inch centers from top to bottom.

The Standard Series 75 can be erected in a matter of minutes—there are no third-piece connectors. Cross members lock immediately and positively to the uprights in a two-piece system. All units are finished in Palmer-Shile Safety White, an innovation that increases rack visibility and considerably improves the appearance of storage areas. Each shelf carries a conservatively rated 4,000-pound capacity. Before you consider the purchase of any rack you owe it to yourself to check into the facts: to see how much better, quicker and more economically the Standard Series 75 can serve your storage needs.



Costs and sizes for the Standard Series 75 are as follows: UPRIGHT FRAMES/96" x 30" (14.25)/96" x 36" (14.50)/120" x 30" (15.50)/120" x 36" (15.75)/SHELF BEAMS/54" (6.90)/90" (12.60)/108" (16.25)/120" (19.55.) All shelf beam prices and specifications are per pair.

PS PALMER-SHILE

SERVING THE MATERIALS HANDLING NEEDS OF THE NATION

16000 FULLERTON, DETROIT 27, MICHIGAN

For more facts Circle 553 on Reader Service Card

GET GREATER SAFETY PROTECTION

in your plant with

GLOBE *Safety*

GRIP-STRUT

the open steel floor grating that is

PATENTED

• FIRE PROOF • SLIP PROOF
• MAXIMUM STRENGTH • MINIMUM WEIGHT

NOW··· Galvanized Standard Finish at NO EXTRA COST

IMPORTANT FEATURES

★ All one piece, not welded, riveted or expanded.
★ Open space in excess of 55% of area for easy access of light and air.
★ No extra supports needed—channels are integral part of the material.
★ Self cleaning.
★ Cut and installed like lumber by your • own maintenance force.
★ Low in original cost.
★ For balconies, no extra sprinkler heads needed.
★ Easy to stand on
★ Cool in summer, warm in winter.

Ideal for work platforms, stair and ladder steps, flooring, balconies, catwalks, machinery guards, fire escapes and for original equipment safety treads.

Write for new catalog

GRIP-STRUT

Distributors in all principal cities. Consult yellow pages in phone book under "GRATING". 127

PRODUCTS DIVISION | **THE GLOBE COMPANY**

4014 SOUTH PRINCETON AVE. • CHICAGO 9, ILLINOIS

Begins on page 256

LABOR RELATIONS

force the time limits set forth in the agreement, (b) thereafter be strict about it, and (c) do not try under any circumstances to negotiate a settlement of a grievance that was not filed on time.

Q. Must the company pay for time spent by union representatives at arbitration hearings? *H. A. H. Personnel Manager.*

A. Not unless the contract expressly calls for such payments. Once in a while, you'll see a contract requiring payment for time spent by union representatives in "meetings" with management, and a claim that this covers arbitration hearings. Don't believe it. A meeting of the sort contemplated by this type of clause does not, by any stretch of the imagination, include arbitration hearings.

LABOR RELATIONS RUNDOWN

No reduction of penalty—The company was boss in this case—not the arbitrator. American Thread Company convinced most judges of the Federal Court of Appeals at Richmond that the arbitrator went too far in reducing a discharge to a suspension. The majority interpreted the contract as giving management the right to determine the penalty once just cause for discharge has been found by the arbitrator. The chief justice of this court, like many other judges, dissented. Some day this majority ruling may become well-established law.

Chiropractic treatment is not medical—When offering health insurance to the union, keep in mind that your contract clause controls your liability, not the policy that the insurance company gives you. You can protect yourself, however, by insisting upon language in the contract which states what the insurance policy will control. (But this is not always an easy concession to get from the union.)

In a recent case, the union contract covered "medical services and supplies performed or prescribed by

Cycling Live Steam and Cold Water Breaks Down Most Hoses... Not Aeroquip Hose of Teflon!

reports Acton Rubber Company Limited, Acton Vale, Quebec

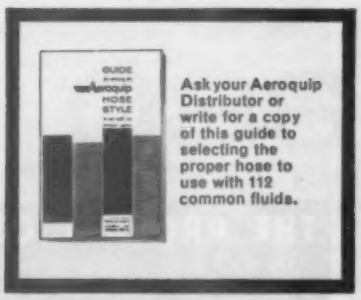
Left: Acton mechanic assembles Aeroquip Hose of Teflon and *"super gem"* fittings.
Right: Aeroquip Hose of Teflon on this hydraulic press cycles steam and cold water.

At Acton Rubber Company, two vital pieces of processing equipment use Aeroquip Hose of Teflon —Acton's hydraulic press and calendar rolls. Steam pressure reaches 125-150 psi. And the calendar rolls cycle steam and cold water.

The switch to Aeroquip Hose of Teflon and reusable *"super gem"* Fittings began more than 2 years ago when troublesome, costly failures of the original hose on the hydraulic press started piling up. Aeroquip Hose was selected as the replacement because the Teflon lining won't break down under temperature extremes. And the strong stainless steel outer braiding will never kink or corrode. This two year old replacement hose line is still giving trouble-free service.

Acton's master mechanic plans to replace all hose lines with Aeroquip Hose of Teflon, as the ordinary hose fails. He's found that he makes important savings on material and labor as well as solving a major maintenance problem, by avoiding costly machine downtime.

Your Aeroquip Distributor can do as much for you. He's listed in the "Yellow Pages" under "Hose." Call him to learn about the complete Aeroquip line of hose and reusable fittings.



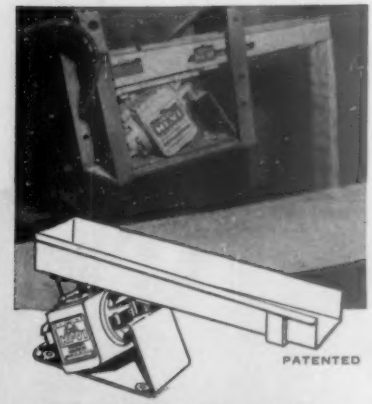
Ask your Aeroquip Distributor or write for a copy of this guide to selecting the proper hose to use with 112 common fluids.

Aeroquip

AEROQUIP CORPORATION • JACKSON, MICHIGAN
INDUSTRIAL DIVISION

ERIEZ *Magnetic Minute*

60 seconds that will help you improve operating efficiency.



FEED MOST ANYTHING, FROM OUNCES TO MANY TONS PER HOUR

There's an Eriez Vibratory Feeder to handle anything from powders to parts, rivets to rocks!

Versatile, AC operated Hi-Vi® Feeders, with 100% range of control, provide accurate, economical performance whether you're feeding a few ounces or many tons per hour. They're ideal for many feeding operations including spreading, sorting, aerating, cooling, drying, sifting, separating, proportioning, formulating, mixing, coating, and dusting.

Only Eriez gives you this exclusive combination of advantages: No rectifier needed (AC operation) . . . Totally enclosed drive element is ideal for hazardous, dusty, wet, or corrosive conditions . . . New fibre glass springs assure superior performance and control, longer life because spring breakage is practically eliminated.

Choose from many models for light, medium, or heavy duty applications.

For big new catalog, write to:

ERIEZ MANUFACTURING CO.
70YA Magnet Dr., Erie, Pa.
ERIEZ OF CANADA LTD.
P.O. Box 5, Sta. W. - Toronto, Ont.

MAGNA-THOUGHT

The selection of any piece of equipment should be based on its ability to perform effectively on the job.

R. J. Torrey

R. J. TORREY
Manager
Research & Development

ERIEZ

A GROWTH COMPANY . . .
18 NEW PRODUCTS IN THE LAST 5 YEARS

Begins on page 256

LABOR RELATIONS

a legally licensed physician or surgeon." Fortunately, the arbitrator ruled that a Pennsylvania licensed chiropractor was not a doctor or surgeon in this sense. But it was pretty clear from the case that if the arbitrator had interpreted the language another way, the company —not the insurance people—would have had to pick up the tab for the unanticipated coverage.

Average pay for engineers—The median average income for members of the National Society of Professional Engineers in 1960 was $10,660; 6.6% higher than in 1958, according to an NSPE survey.

No paid insurance premiums for strikers—The clause required the company to pay insurance premiums for "employees in active service." A striker is not in active service, declared the company (American Radiator and Standard Sanitary Corporation), since he is not working and producing. It pointed out that for some years premiums had not been paid for employees who were laid-off for lack of work—they were not "in active service." Why not the same rule for strikers? Arbitrator Cyril Kavanagh agreed.

Lack of fuel is a heavenly fault—Under most union contracts, employees who are sent home or laid-off because of an Act of God, have no right to complain. Excluded from divine management are those events which could have been prevented by the company through the exercise of reasonable care and foresight. Normally, lack of fuel doesn't fall into an "Act of God" category, but it did when a United States Steel Company plant in Alabama ran out one record cold month. Because of the unprecedented cold, the fuel supply company was caught short—couldn't meet the demand.

Back pay awards and how to void them—Richmond-Chase Corporation latched on to a way of voiding a back pay award, but its victory was short-lived. Not satisfied with a back-pay award, it went to court to get it vacated. The union moved

PROPHET
Complete FOOD SERVICES

MASS FEEDING IS A JOB FOR SPECIALISTS

The large-scale buying, preparation, and service of food requires professional knowledge, experience, and skill. The Prophet Co. has for 43 years successfully met these requirements for its clients (more than 210 from coast-to-coast) in an almost unlimited variety of fields. They include industrial plants, bank and office buildings, colleges and universities, department and specialty stores, hospitals, motels, military establishments, camps, YMCA's, etc. Prophet also owns and operates 5 distinctive Monte's Restaurants in Detroit, Cincinnati and Chicago.

Because of high quality control standards, Prophet organized food services assure smooth, efficient operation and capable managerial supervision, regardless of the size or type of general or specialized food service requirements.

•

GENERAL and OFFICE CAFETERIAS

SERVICE and EXECUTIVE DINING ROOMS

SNACK BARS

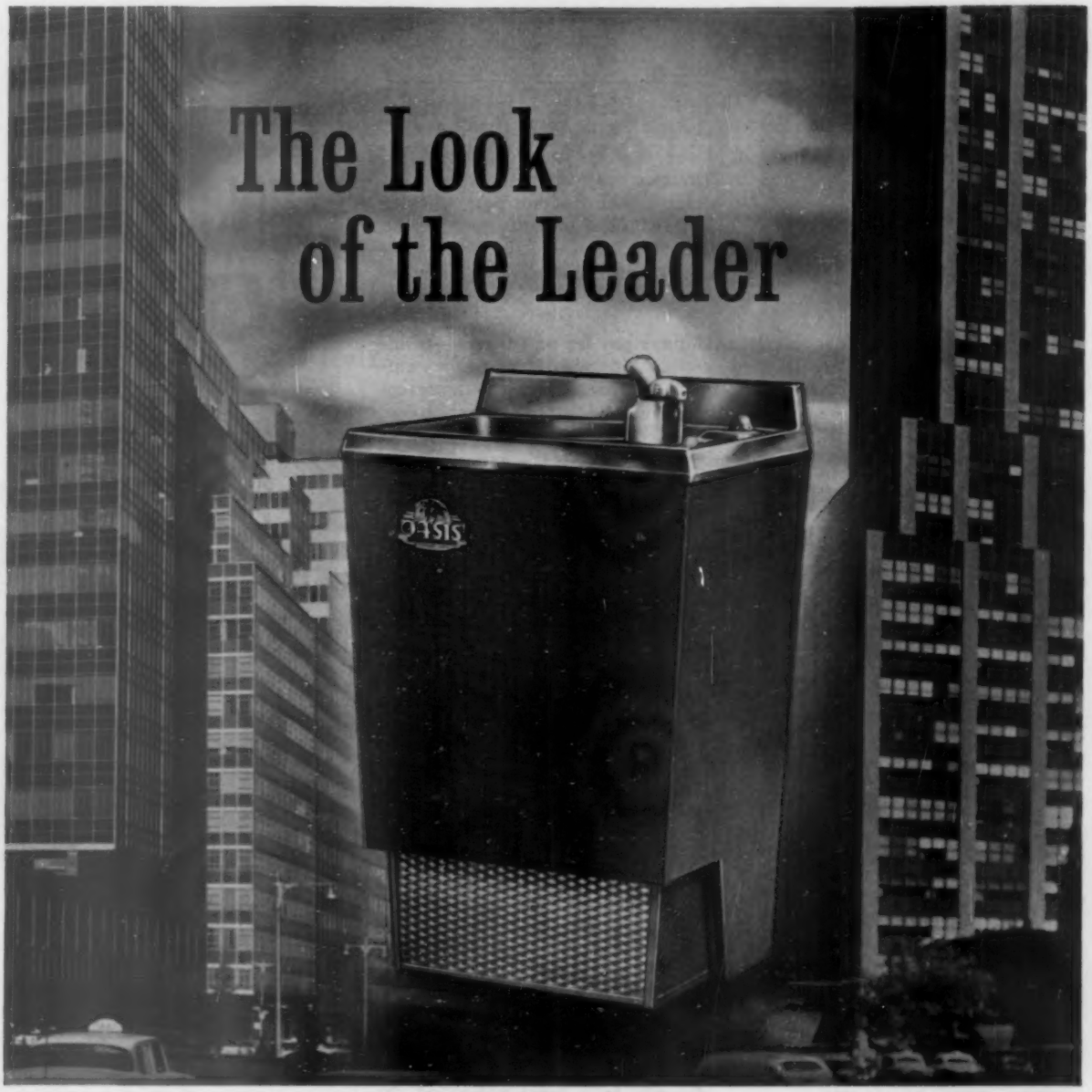
SPECIAL AFFAIRS

VENDING . . . complete automatic food and beverage vending machine operations

•

Write, wire, or phone . . .
we'll be glad to tell you more

THE PROPHET CO.
710 Fisher Building, Detroit 2, Mich.
1418 N. Highland Ave., Los Angeles 28, Calif.



Performs as well as it looks, too. Quietly, dependably. Endures the rigors of everyday use and abuse year after year. Carries the best warranty in the industry: a full 5 years on all parts. Super efficient Pre-Cooler nearly doubles cold water capacity at no extra cost. Stainless steel top can't rust, tarnish, chip, or crack. Oasis Water Coolers serve more offices and shops than any other kind. Available in pressure or bottle-types . . . Standard or Hot 'n Cold. Write for free, illustrated booklet.

oasis

America's Preferred

WATER COOLERS

BY THE EBCO MANUFACTURING COMPANY

rented or sold everywhere

THE EBCO MANUFACTURING COMPANY
Dept. 2-Y, Columbus 13, Ohio

Please rush me free booklet on Oasis Water Coolers.

name_____

company_____

street_____

city_____ zone_____ state_____

For more facts Circle 558 on Reader Service Card

ERIEZ Magnetic Minute

60 seconds that will help you improve operating efficiency.

PATENTED

How much will an ERIEZ PERMANENT MAGNETIC PULLEY save you?

Erium® powered Eriez magnetic pulleys save one firm $1200 a year by removing 50 pounds of tramp iron a week from coarse clay. They can save you as much—or more, depending on your application.

In addition to preventing machinery damage, Eriez permanent magnetic pulleys prevent fires and explosions; assure product quality.

The pulley illustrated is one of 192 sizes (up to 36" diameter in any belt width) made by Eriez. **There is one for your exact application.** Two basic models are available: **Type AA,** ideal for separating small and medium tramp iron and fine ferrous contamination; **Type CR,** which performs best in removing large pieces of tramp iron.

All models are engineered and constructed to give you the finest in automatic separation. All are powered by Erium®—our exclusively-designed power source. Model for model, Eriez units give you the finest quality and consistency of magnetic strength.

For descriptive bulletin write to:

ERIEZ MANUFACTURING CO.
70YB Magnet Dr., Erie, Pa.
ERIEZ of CANADA LTD.
P.O. Box 5, Sta. W - Toronto, Ont.

MAGNA-THOUGHT

We willingly share our design and application know-how to help our customers find new ways to improve their plant efficiency and product quality.

E. J. TENPAS
Supervisor,
Magnetic Engineering

ERIEZ

A GROWTH COMPANY...
10 NEW PRODUCTS IN THE LAST 5 YEARS

Begins on page 256

LABOR RELATIONS

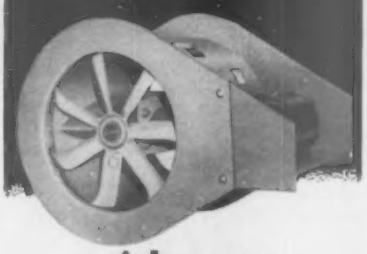
to have it confirmed. The company won its point—but lost the battle. The court ruled that the award was defective, since it didn't say whether or not social security was to be deducted. But to the company's disappointment, the court simply ordered the case back for a re-hearing.

Holiday pay for part-timers—In increasing numbers, part-time employees are taking an important place in the American work force. In this group are the women who wish to pick up a few extra bucks to buy the things that green stamps won't purchase. And the men who hold full-time jobs, but are willing to work harder for additional dollars. Finally, there are the men and women who can retire at age 62 under Social Security, and want to earn just enough to avoid having their social security pay reduced.

When taking on such help, watch your union contract and policy statements to make sure that provisions applicable to full-time employees are not inadvertently applied to part-timers. For example, the Bates Shoe Company of Connecticut found itself tagged with a holiday pay bill for its part-time people. The clause in its union contract had been painted with too broad a brush.

No job for recalled employee rejected by the company doc—Whether or not a company can send home a recalled employee on the mere say-so of the company doctor depends to a great extent on the kind of physical exam clause the company has. Mosaic Tile, of Ohio, must have had a beaut, because Arbitrator B. Meredith Reid upheld the disqualification of the employee after he failed to get a stamp of approval from the company doctor. As Reid saw it, he was to answer this question: Can the company, under its contract provision, reject employees if they do not measure up to the company's required physical standards as determined solely and unilaterally by the company's doctor? The answer was yes—because there was nothing arbitrary or capricious about the company's decision. Nor was the employee fired. He was merely laid off as the clause

combat CORROSION the modern way...



with new

Aerovent

FIBER GLASS DUCT FANS

Featuring a unique built-in orifice and tear-drop shaped belt housing, Aerovent *Fiber Glass* Duct Fans are designed for your "*problem*" ventilating requirements. Virtually unaffected by normal concentrations of corrosion and most forms of chemical attack, *fiber glass* – used in the construction of the fan housing and other internal surfaces—assures longer, more dependable service in even the most difficult applications.

Propellers are stainless steel or Dura—a special alloy created by Aerovent for better resistance to corrosive atmospheres. Available in 17 models in sizes 14" to 42" for capacities to 32,500 cfm.

write for bulletin 175

CERTIFIED PERFORMANCE

Aerovent *Aerovent*
FAN COMPANY, INC.
Ash and Burd Streets Piqua, Ohio

reflective aluminum roof coating made with pigments *from* ALCOA

UNIFLEX TOPS A TRUCK TERMINAL

One application of Uniflex Aluminum Roof Coating on its Memphis warehouse had three results, reports management of Strickland Transportation Co., Dallas, Texas. Uniflex, made by Acorn Refining Co., Cleveland, Ohio, restored and weatherproofed the roof . . . improved appearance of the entire building . . . reduced summer temperature on the dock area. Investment in material and labor was modest.

Made with Alcoa® Pigments, aluminum coatings like Uniflex are preferred protection today on hundreds of public and industrial buildings. Maintenance experts have found that one coat seals any surface—metal, masonry, composition—with a moistureproof shield that won't sag in summer or crack in winter.

Inside temperatures in summer are noticeably reduced because the reflective aluminum flakes turn back the sun's radiant heat. Applied with ordinary roofing brush or heavy-duty spray equipment, these coatings come ready mixed . . . require no thinning or heating.

Look at *your* roof today. Up to your standards? An aluminum coating like Uniflex will restore new appearance—and weatherproof your property for years.

Alcoa does not make roof coatings, but we'll be happy to refer you to reputable people who do. Please send the coupon for our informative booklets.

Entertainment at its Best . . . **ALCOA PREMIERE** with Fred Astaire as Host . . . Tuesday Evenings, ABC-TV

ALCOA ALUMINUM

PIGMENTS, PASTES & POWDERS

Aluminum Company of America
1750-L Alcoa Building, Pittsburgh 19, Pa.

Please send your free booklets:
☐ *Painting With Aluminum*
☐ *Aluminum Roof Coatings Make Time Stand Still*

Name_____

Company_____

Address_____

City_____ Zone_____ State_____

For more facts Circle 561 on Reader Service Card

ERIEZ Magnetic Minute

60 seconds that will help you improve operating efficiency.

Here's POWERFUL PATENTED MAGNETIC PROTECTION for LIQUID PROCESSING EQUIPMENT

Handling liquids or slurries? Permanent Magnetic Ferrous Traps by Eriez protect against fine iron and tramp iron contamination to —

- Help assure product purity.
- Reduce damage and maintenance to filters, mixers, pumps, etc.
- Eliminate clogging and production slow-downs.

In the full line of Eriez Ferrous Traps there's a standard or sanitary model for your application . . . ideal for use with foods, chemicals, ceramic slips, hydraulic oil lines, etc. All models offer these characteristic benefits:

- Rugged cast one-piece bodies that easily withstand working pressures up to 150 psi.
- Clean, simple design — no moving parts.
- Magnetic element handles materials with temperatures up to 850° F.
- Easy to inspect and clean; magnetic element lifts from the body in seconds.

For technical and application data write to:

ERIEZ MANUFACTURING CO.
70YC Magnet Dr., Erie, Pa.
ERIEZ OF CANADA LTD.
P.O. Box 5, Sta. W. - Toronto, Ont.

MAGNA-THOUGHT

Our greatest source of satisfaction is the acceptance our products have earned through superior performance and dependability.

M. L. CRAMER
Office Sales Manager

ERIEZ

A GROWTH COMPANY . . .
10 NEW PRODUCTS IN THE LAST 5 YEARS

Begins on page 256

LABOR RELATIONS

required. Here's what the clause looked like:

"The Company may require a physical examination for employees laid off for a period in excess of thirty (30) days. This shall be used primarily for the purpose of determining his physical fitness for the job for which he was recalled and furthermore shall not be used to discriminate against employees.

"Any employee who is rejected upon recall due to this physical examination shall have the right to examine his medical report.

"If an employee is found physically unfit for the job to which recalled, but is otherwise employable, he will be given preference in filling vacancies at work he can perform, and desires, in accordance with the seniority provisions of the agreement. If such an employee takes a job outside of his regular department, he may, by application, indicate his desire to return to a certain job or jobs in his regular department, whereupon the Company shall offer him the first such job which opens up and which he is able to perform, and for which he has the necessary seniority."

Increasing wages—The rule is that an employer may not increase wages or change working conditions during contract negotiations. As far as the NLRB is concerned, this means he's guilty of not bargaining in good faith. But a U. S. court of appeals at New York let the company get away with it on a technical point. Before the Board can reach such a conclusion, the court said, it must give the employer an opportunity to show he was bargaining fairly; that he had not intended to hamstring negotiations.

Severance pay—With some employees a job's a job. As long as they can do it, its content matters not. Others are more fussy. A clerical employee of a telephone company chose severance pay and unemployment rather than be a telephone operator. Arbitrator Russell N. Sullivan stood squarely behind her. Ruled Sullivan:

"An employee need not accept an unreasonable transfer. She had at-

54* by Crown
VALUE PRICED!

$1970.00
Lifts loads up to half ton safely, efficiently. Operates in narrow aisles.
MODEL H-57
$2970.00
1500 Lb. capacity includes batteries and built-in charger. Lowest price power lift.
MODEL B-57
$9970.00
Compact, power propelled, power lift. Includes batteries and built-in charger.
MODEL W-57

*Send for free catalog of 54 Models.

CROWN CONTROLS CO., INC.
TORY AVENUE
NEW BREMEN, OHIO
MATERIAL HANDLING DIVISION

WIL-GARD PROTECTS WORKERS' HANDS

Against the 200 Most Common Industrial Chemicals

Choose from 12 quality Wil-Gard lines to select the gloves that provide *maximum* protection against the chemicals used in your plants or laboratories. For guidance, send for Wilson's Industrial Glove Catalog, which lists the 200 most common industrial chemicals and gives a resistance rating for each, as applied to Wil-Gard Neoprene, Rubber, Latex, Buna-N, and others. Tough Wil-Gard Gloves not only resist chemicals dependably, but wear longer . . . provide extra comfort . . . assure maximum finger and hand flexibility. Your Wil-Gard Distributor can give you expert help in ordering the gloves you need.

INDUSTRIAL GLOVES
Polyethylene (Poly-D)
Natural Rubber
Soft-Lined Latex
Unlined Latex
Soft-Lined Black Neoprene
Unlined Black Neoprene
Buna-N
Polyvinyl Alcohol (Compar Plastic)
Polyvinyl Chloride (Tru-Touch)

LINEMEN'S GLOVES
Natural Rubber
Leather Protectors

DRY BOX GLOVES
Wil-Gard Interchangeable
Berkeley Box
Sleeve and Glove Combination

SOLD ONLY THROUGH DISTRIBUTORS

WR-1061-35

PROTECTION FOR THE HANDS OF INDUSTRY • SINCE 1916

WIL-GARD®

THE WILSON RUBBER COMPANY INDUSTRIAL DIVISION CANTON 6, OHIO

A Division of Becton, Dickinson and Company • Pacific Coast Warehouse: 530 Howard St., San Francisco 5, California

PROTECTION FOR THE HANDS OF INDUSTRY WIL-GARD

New DAY "RJ" Dust Filter

CONTROLS DUST SAVES DOLLARS

only 3 moving parts

Built under patents of The DAY Company and H. J. Hersey, Jr.

Because of its new, simplified design the DAY "RJ" dust filter will save you many dollars on initial investment, installation, operation and maintenance. Some of the important new construction features of this dust filter are: a new, quick-opening reverse-air, counter-flow valve for maintaining filter media porosity; a new, reverse-air pressure blower arrangement, and new, air tight, yet quickly opened inspection doors.

This patented DAY dust filter has only 3 moving parts but controls dust effectively, efficiently (99.99+%) and economically. It represents the latest refinement in a long-tested, plant-proven dust filter. Using felted filter sleeves to capture dust, the "RJ" is now available in 5 sizes for handling from 300 to 6400 CFM of air (for larger capacities, multiple groupings are furnished).

For more detailed information write toDAY for free Bulletin G-30. It's filled with facts, specifications and dimensions.

The DAY Company

SOLD in UNITED STATES by
The DAY SALES Company
858 Third Avenue N.E.
Minneapolis 13, Minnesota
FEderal 6-9671

MADE and SOLD in CANADA by
The DAY Company of Canada Limited
Rexdale (Toronto), Ontario, Canada
Fort William, Ontario, Canada
Rexdale, Cherry 1-8589

Representatives in Principal Cities

EXPERIENCE ENGINEERED . . . LABORATORY TESTED . . . PLANT PROVEN
Dust Control • Pneumatic Conveying • Bulk Storage
EQUIPMENT . . . SYSTEMS . . . INSTALLATION

Begins on page 256

LABOR RELATIONS

tended school and had received specialized training in shorthand, typing, and other office procedures. Her employment with the company was in a classification which utilized those skills and for which at least some of them were required . . . Although it was commendable of the company to attempt to find another position . . . for her, she was under no duty to accept a transfer to a position completely different from the one formerly held."

Arbitrator Sullivan might have ruled otherwise had the employee been a telephone operator before or had her skills been less specialized.

How long is 5 days?—And can a union be so silly as to take to arbitration the suspension of an employee for 5 days because it felt the 5-day period should include Saturday and Sunday—non-workdays. The contract said that the company could suspend an employee "for five calendar days." The arbitrator concluded that the contract really intended work days—and ruled accordingly. But, of course, it would have been better if the contract clause had been drawn more clearly.

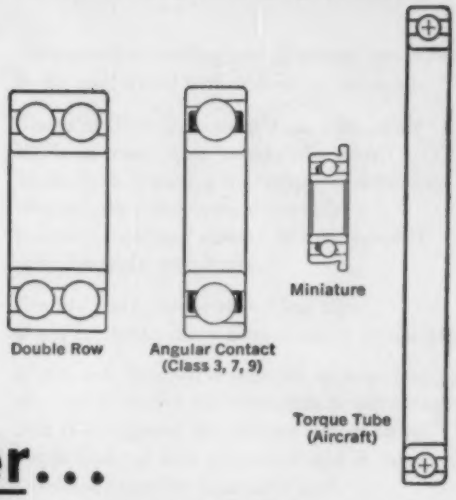
Management trainees—Management trainees are in a position similar to that advanced teen-age state of not being adults—and not being children either. That is, if the company's training program requires them to perform worker tasks for the nonce. A union argued, in a proceeding to clarify a bargaining agent certification, that they should be included in the unit. They shouldn't be, answered the NLRB. Their interests are more closely allied with management than with employees.

Arbitration—If you don't want to arbitrate, make it known right away—refuse to submit to the arbitrator's jurisdiction. A New York court told an employer he missed the boat when he contested an arbitration after participating in four hearings.

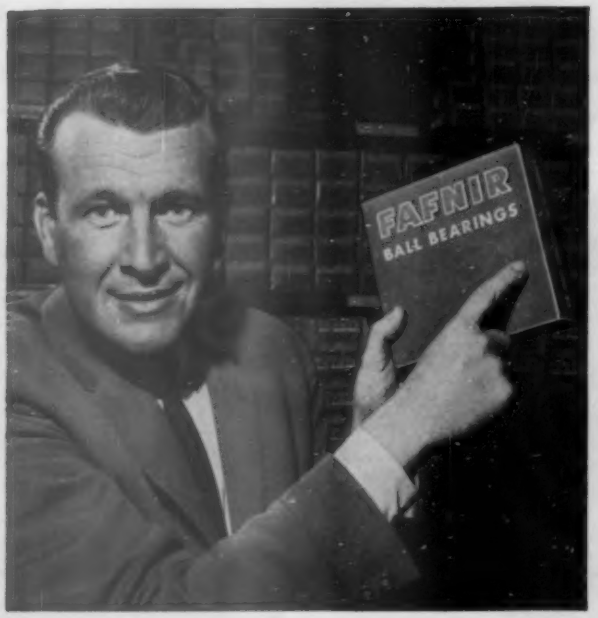
(Items in this section are developed from full citations published by the Bureau of National Affairs, Inc., Washington, D.C., and from other sources.)

Here's one good reason for replacing with FAFNIR BALL BEARINGS

Whatever the type, size, or precision you want in ball bearings, Fafnir makes what you need! This complete line features bearings for everything from instruments to machine tools . . . including such pioneering developments as miniature ball bearings of vacuum-melt stainless steel. For diversity, quality, *leadership* . . . look to Fafnir!



. . . and here's another . . . your Authorized Fafnir Distributor



Your Authorized Fafnir Distributor has everything you need in ball bearings . . . all types, all sizes, for all purposes. And he's ready to help — day or night — when you need bearings in a hurry!

For job-perfect replacements . . . for top-flight service . . . for sound advice on bearing problems . . . call your Authorized Fafnir Distributor. Like you . . . he is paying his share of U. S. taxes. The Fafnir Bearing Company, New Britain, Conn.

FAFNIR
BALL BEARINGS

For more facts Circle 566 on Reader Service Card

Industrial Distributors (Sales), Ltd.

FACTORY

Each of these jobs is done better and cheaper with natural diamonds

Here are four cutting and grinding operations being performed with industrial diamonds.

Three of them were once done with other kinds of tools. One couldn't be done at all, were it not for the unique *combination* of properties that only diamonds possess—excellent cutting ability coupled with fantastic endurance.

Result: your people spend less time changing tools, more time actually producing.

If you cut, sharpen or smooth in your business, you can probably use diamonds to advantage. Test them against the method you're using. You'll find out how efficient – and economical – a diamond can be, especially now.

Best grit for metal-bond wheels developed by the Diamond Research Laboratory in Johannesburg

A new impact crushing method for natural diamonds is producing the strongest and most durable diamond grit ever obtained for metal-bond wheels. Your tool and wheel manufacturer is ready to help you select the diamond tool that's right for *your* job.

1 **Dressing Grinding Wheels** *that groove propeller shafts for Evinrude Motors, Milwaukee. Cutters are powdered metal matrix impregnated with small, blocky natural diamonds. They show no wear after months of use.*

2 **Boring and Facing Aluminum** *pinion carriers for Chrysler Corporation, Detroit. Dimensions are held within ±.001 inch, producing finishes to 20 microinches. Conventional tools could not withstand aluminum's abrasiveness, nor meet these tolerances.*

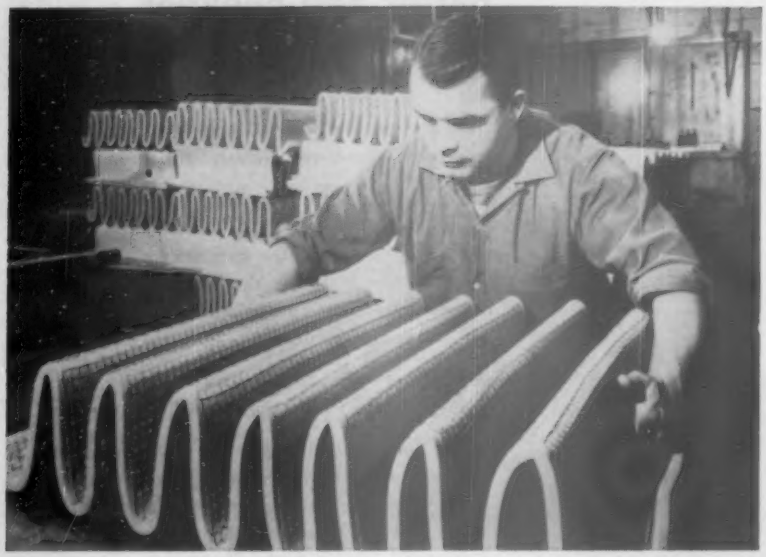
3 **Grinding Synthetic Sapphire** *and quartz rods with diamond grinding wheel. Tolerances for diameters: ±.0002 inch; concentricity: ±.0002 inch. After trying every other grinding method, this diamond-coated unit was installed by Duncan-Inglewood, Inc., Inglewood, Calif. Rods are now being turned out on a production basis.*

4 **Band-Sawing Optical Glass.** *New diamond-coated band-saw blade cuts optical glass to pattern shapes at Dia-Chrome, Inc., Glendale, Calif. Diamond band saw can also cut reinforced plastics, ceramics, marble. Thin materials can be cut without coolant; dense materials require water or water-oil emulsion.*

Industrial diamonds cut practically everything . . . especially your production costs

MATERIALS NEWS

For more data, circle item numbers on Reader Service Card next to back cover.



Pleated foam rubber air filters

New urethane foam rubber, substituting open pores for membranous windows, makes an efficient pleated filter for use in factory ventilating systems.

The new air filter has an estimated life expectancy of 15 years and has exceptional dust-holding capacity (trapping particles down to three microns) while permitting air flow velocities of up to 450 ft. per min.

Unlike all-metallic units, the foam can be washed while in the filter bank and re-used without oiling or other treatment. *Scott Paper Co.* (Circle 195)

Laminated foam for lightweight insulation

Rigid urethane foam, containing tough laminated membranes, provides roof insulation at quarter the weight of comparable fiberboard treatment. Panels are easier to handle and can be applied directly to hot roofing bitumen. They possess extremely low thermal conductivity and will not absorb water. Tests indicate that the plastic material, honeycombed with minute closed cells, has an insulating value better than still air. *Barrett Div., Allied Chemical Corp.* (Circle 196)

197—Movable walls for industrial plants provide an average of 39 decibels sound reduction, while a communicating panel permits access between divided areas. A thirty-foot length of the rockwool-packed steel panels stacks two feet deep. *The E. F. Hauserman Co.*

198—Marking device for round chart recorders comes in a single unit containing everything from ink cartridge to stylus point. Sealed until ready for use, the capillary device contains ink supplies to last days, and often months. *Esterbrook Pen Co.*

199—Fuel supplements for gas and diesel trucks increase mileage up to 20 per cent. Reducing particle size in fuels to less than quarter micron size, the supplements allow for a complete burning of fuel in combustion chambers. *Fuels Research Service Co.*

Ceiling fire panels

Crucial steel joists in factory structures can be protected from flame and intense heat for over three hours by these economically installed 2 x 5-ft. mineral product fire panels. Fastened to standard-type nailing channels with annular ring nails, their end joints may be reinforced by steel bridging clips.

These panels are suitable for use in garages, warehouses, plants, and similar areas where appearance is not of primary concern. *Armstrong Cork Co.* (Circle 200)

Turn the page

New JOHNSON G-1200

indicating receiver

For Pneumatic Transmission Systems

- Provides direct indication of temperature, pressure, humidity, or other variables, for which suitable transmitters are available.
- Designed for flush mounting on a panel, in either vertical or horizontal position.
- Multi-purpose Selecto-Scale® tape is imprinted with scales for three transmitter spans. Includes both horizontal and vertical imprints. Tape reels onto spools, leaving selected portion of scale range aligned with 3-15 psi fixed scale below tape.
- With movable set point indicators centered at midpoint of the selected scale ranges, the operator can observe any number of units and instantly detect deviations.
- Optional "Off-Normal" alarm feature provides either separate or common signal for high and low conditions.

For complete information, write for Bulletin G-1200. Johnson Service Company, Milwaukee 1, Wisconsin. 110 Direct Branch Offices.

JOHNSON CONTROL

PNEUMATIC SYSTEMS

DESIGN • MANUFACTURE • INSTALLATION • SINCE 1885

Warehouse Order Picking at its FASTEST!

NEW L-S® Model "H" ORDER PICKER...

tailored for high volume order selection 2500 Lbs. Cap.

Designed to increase order picking productivity, the Model H takes the picker right to his work . . . FAST! He rides combination fork-platform up to 72" elevation . . . fills orders quickly at first, second, or *third* pallet rack levels. Powerful 24 volt electric system provides fast travel and lift speeds to cut time on the order selection line. Controls on rider platform for all horizontal and vertical movement allow 100% order selectivity.

The Model H is ideal for pallet or platform right angle stacking, too. Loads 40" long can be easily placed in racks from 9' aisles . . . shelf goods from 4' aisles.

Other outstanding features include: 3 speeds forward or reverse up to 5 mph, smooth dynamic braking, exclusive L-S high pressure hydraulics providing fast lift speeds up to 55 fpm, highest quality traction drive unit, all welded chassis, fume-free heavy duty electric system and clean lubricated-for-life design.

For complete specifications on this Model H Order Picker, ask for Special Application SA-32-6 and "Trucks in Action" bulletins showing this new truck at work.

LS LEWIS-SHEPARD®

6010 WALNUT STREET • WATERTOWN 72, MASS.

The MASTER® Line — The COMPLETE Line of Materials Handling Equipment

Begins on page 270

MATERIALS NEWS

For more data, circle item numbers you want on Reader Service Card.

201—Sealing strip for heavy duty contains a base of neoprene latex over which is applied a continuous film of polyurethane—a proven isocyanate coating. The new strip has high abrasion resistance and toughness with no loss of flexibility. *Bridgeport Fabrics, Inc.*

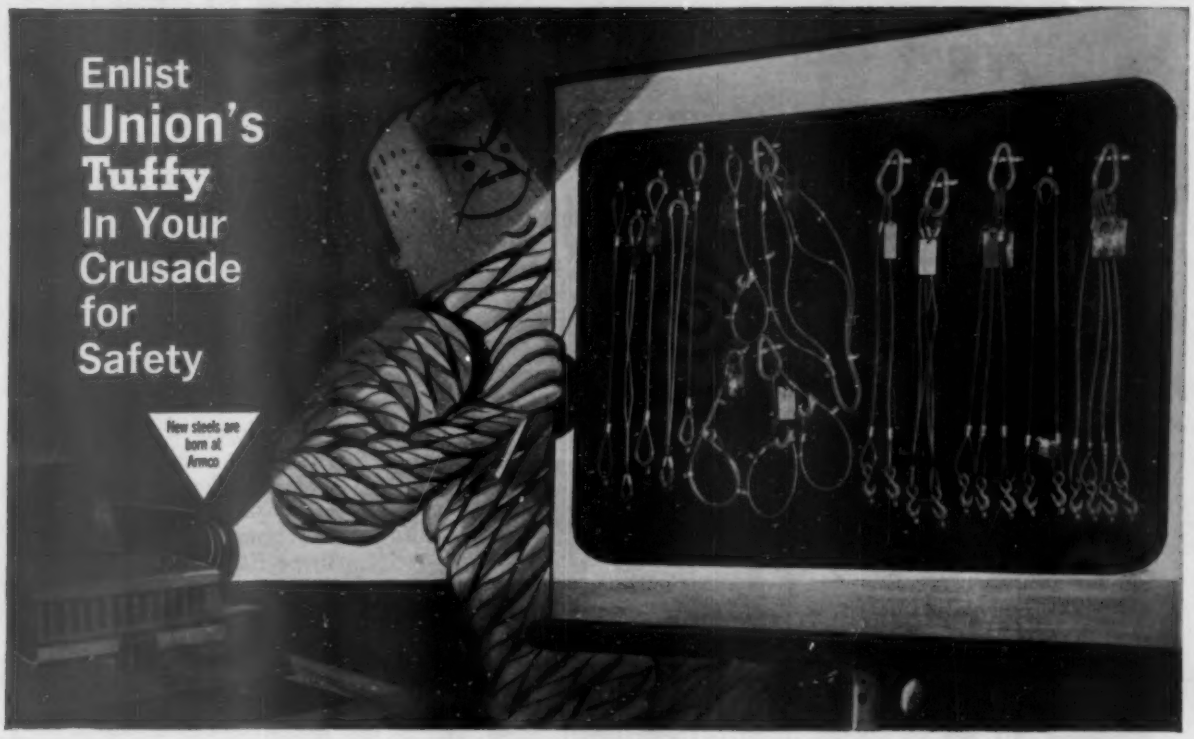
202—Goggle cleaner called Clear-Sight dissolves splatter and prevents irritating fogging under humid conditions for safety glasses, plastic face shields, and plastic goggles of all types. The emulsion will not scratch or mar plastic safety equipment. *Disco.*

203—Drum scale in boilers can be corrected with two chemical mixtures: a liquid scale remover with a hydrochloric acid base, and a solid sulfanic acid formula. Also free help on scale formation regardless of plant's boiler size. *Virginia Chemical & Smelting Co.*

204—Castable refractory has high abrasion and thermal shock resistance. With pneumatic gun placement it has low rebound loss and minimal dusting. Suitable for lining ash pits, incinerators, boiler furnaces and rocket engine firing bays. *Babcock & Wilcox Co.*

205—Self-locking nuts incorporate two tapered members that produce a friction and compression lock. Stripping and distortion is reduced by increased contact area. Sizes: stock, ¼ to ⅞ in., special, up to 3 in., in both national coarse and fine. *Tapand, Inc.*

Turn the page



"Accidents on the job cost industry more than $4 billion a year," reports the National Safety Council. 230 million man-days were lost, nearly 2 million disabling injuries were suffered in 1959. As rough as these figures look, they represent progress. The accident rate has been cut in half since the twentieth century started.

In plant after plant demonstrations by Union fieldmen have pointed the way to accident reductions. They show how the correct use of the right set-up of Union's Tuffy Slings and Hoist Lines affords greater safety and longer service life.

Proper Fittings Add Safety, Too

Union provides a sling fitting for every need. Fully described in the Tuffy Sling Handbook. Have them factory-fitted when you order slings or rig them yourself. Enroll in Union Tuffy's safety-lift club. Start by sending for the two books offered below.

Union Wire Rope **Tuffy Tips** on safe use of Slings and Hoists

Lifting Strains Take High Toll of Injuries

Did you know that in some states one in every six compensation claims involves back injuries? And that one insurance company says back injuries constitute 60% of their claim expense? Hernia is another hazard of materials handling. One manufacturer reported 75% of his compensation claims involved hernias. This high incidence of hernias and back injuries can be greatly reduced by proper lifting equipment and methods.

Free! Two Valuable Tuffy Handbooks

1. "Tuffy Tips" include many more safety hints. Also tells how to use wire rope and slings to get longer service life. Tuffy Tips do's and don't's can mean money in your pocket.

2. "Tuffy Sling Handbook." Tells all about slings from A to Z. Contains helpful data on the selection and use of slings—types, dimensions, weights, fittings, rated loads, safety-approved signals.

6-61

BOTH FREE! Write Union Wire Rope, Armco Steel Corporation, 2234 Manchester Ave., Kansas City 26, Missouri

ARMCO Union Wire Rope

For more facts Circle 570 on Reader Service Card

HERE'S HOW MANAGEMENT CAN IMPROVE EFFICIENCY

by

BREAKING THE DELEGATION BARRIER!

An important new film for management

This half-hour motion picture "Breaking the Delegation Barrier" will increase the efficiency and growth of supervisors, their men and your company by vividly showing how to overcome the barriers which prevent managers from taking full advantage of the benefits of delegating authority and responsibility.

Many leaders of American industry use Roundtable films. For example: Firestone, G.E., Alcoa, G.M., Allis-Chalmers, DuPont, U.S. Steel, Shell, I.B.M., Reynolds, Union Carbide.

ROUNDTABLE Productions
275 South Beverly Drive / Beverly Hills / California

Write now for full information or an executive preview print.

Roundtable Productions Dept. F
275 S. Beverly Drive
Beverly Hills, Calif.

☐ Please send complete information.
☐ Please send preview print.
($5 covers handling & postage)

Name_____
Dept._____
Company_____
Address_____
City_____ Zone____ State_____

Begins on page 270

MATERIALS NEWS

For more data, circle item numbers you want on Reader Service Card.

206—Aluminum impregnated into any textile, leather, paper, plastic, or fabric will give heat resistance up to 2500 F. by means of low-cost process. For use in any plant requiring abrasion resistance, high heat reflectivity, freedom and peel, etc. *Thermo-Chem Corp.*

207—Thermoplastic strips with a low friction coefficient remain virtually unchanged over a wide range of temperatures, bearing loads, and relative surface speeds. Can be used for gaskets, washers, factory conveyor-line wear strips, and dead plates. *A. L. Hyde Co.*

208—Synthetic rubber with a new cis-polybutadiene formula will provide 35% more tread mileage for plant trucks. Additional application may even double trucking tire life by increasing durability and lowering operating temperature. *Goodyear Tire & Rubber Co.*

209—Roofing compound can be sprayed on any structure, however irregular in shape. The compound, made of neoprene, hypalon, and chopped glass-fiber roving is paintable and can be sprayed to a thickness of 1/16 in. or more if needed. *Ply-O-Glas Co. of America.*

210—Long mandrel rivets can be inserted and set from the same side of the work. Applicable to material up to 2-in. thick, the mandrel does not break after rivet has been set. Plates are used with rivets to spread its high grip strength. *United Shoe Machinery Corp.*

Turn the page

COSTS UP?

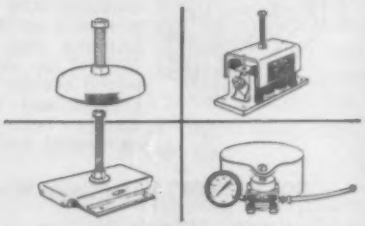
MACHINES TIED DOWN?

Plant moves, rearranging layouts, new machine installations all cost money — and the cost *is* excessive if you make a practice of lagging your production equipment to the floor.

Wouldn't it save money in your operation if you could forget about spotting, drilling, shimming, lagging and all the other costly necessities that go with tying down machinery? By using BARRYMOUNTS® you eliminate those expenses *and* repeat your savings whenever you relocate a machine.

Barry offers *three* different resilient elements: neoprene, helical springs or air to solve your individual requirements. These quality-engineered Machinery Mounts not only provide the ultimate in layout flexibility — they pay big dividends too — isolating shock and vibration, improving precision, reducing machine and building maintenance. Even operator efficiency goes up as noise levels come down.

If you want to add cost-saving efficiency to your operation — look into a BARRYMOUNT® program. Write for Bulletin 60-04C, "Practical Considerations When Installing Machinery."



BARRY CONTROLS
SHOCK • VIBRATION • MACHINE EFFICIENCY
Division of Barry Wright Corporation
700 PLEASANT ST., WATERTOWN, MASS.
1400 FLOWER ST., GLENDALE, CALIF.

Introducing the

New STANLEY Low-Cost pneumatic door operator

- **LOW INITIAL COST**—less than any other automatic door equipment with complete control of door at all times.
- **LOW OPERATING COST**—pneumatically powered directly from your regular plant air lines.
- **LOW MAINTENANCE COST**—simplified design and construction virtually eliminate maintenance.

The STANLEY MAGIC-DOOR (LCP) Operator will mean increased production as materials move faster and more efficiently. Automatic door opening and closing will cut down congestion and reduce damage to doors, equipment, and materials caused by "battering" and spillage. Stanley's Low-Cost Pneumatic Operator also answers the need for controlled isolation of departments, conserves costly warm and cool conditioned air, and helps maintain specific humidity and temperature requirements.

LCP MAGIC-DOOR Operator is easily installed on single sliding doors up to 300 pounds in weight. Full-cycle power gives positive control throughout opening and closing action. Operating speed is easily adjustable. It can be activated by push button, pull cord, kick plate, floor plate or photoelectric controls.

See your local STANLEY MAGIC-DOOR Distributor for details on the new, Low-Cost Pneumatic Operator, or write to: Stanley Hardware, Division of The Stanley Works, MAGIC-DOOR EQUIPMENT SALES, Dept. K, 12 Lake St., New Britain, Connecticut. Sales, installation and service distributors in principal cities in the United States and Canada.

STANLEY

REG. U. S. PAT. OFF.

AMERICA BUILDS BETTER AND LIVES BETTER WITH STANLEY

This famous trademark distinguishes over 20,000 quality products of The Stanley Works, New Britain, Conn.—hand tools • power tools • builders hardware • industrial hardware • drapery hardware • automatic door controls • aluminum windows • stampings • springs • coatings • strip steel • steel strapping—made in 24 plants in the United States, Canada, England and Germany.

CANADIAN PLANTS: HAMILTON, ONTARIO AND BOWTON, POND, P.Q.

GUARANTEED

to give drip-tight leak-proof seal

greates[illegible]c in unions **DART**

For over 55 years the firm guarantee back of each and every DART UNION sold has been — *"if one should leak through we will give you two"!* The record reveals that less than 1 in every 100,000 has proven to be faulty. The extra wide bronze to bronze seats, precision ground to a true ball joint, mounted in heavy malleable iron pipe ends and protected by an extra heavy union nut, make a drip-tight, leak-proof connection WITHOUT EXCESSIVE WRENCHING time and time again.

Guarantee positive tight connections and extra long service on your pipe lines by using the DART GUARANTEED UNION.

Yours on request: Descriptive brochure on Dart Unions and Union Fittings.

DART UNIONS *Products of* DART UNION COMPANY PROVIDENCE, R. I.

GENERAL SALES AGENT

THE **Fairbanks** COMPANY
393 LAFAYETTE STREET, NEW YORK 3, NEW YORK
BRANCHES: NEW YORK 3
PITTSBURGH 22 • BOSTON 10 • ROME, GEORGIA

For more facts Circle 574 on Reader Service Card

MAN IN MOTION

Down goes a Magliner, down go costs! And they *stay down* with Magliner Magnesium Dock Boards on the job! Magnesium light for *one man handling*, magnesium strong for rugged service, Magline-designed to keep loads in motion—safely, smoothly, *economically*! Send today for your copy of "Difficult Dock Problems"—the bulletin that helps you *spot and correct* high-cost dock loading problems.

Request Bulletin DB-204. Magline Inc. P.O. Box 311, Pinconning, Michigan

MAGLINER MAGNESIUM DOCK BOARDS

For more facts Circle 575 on Reader Service Card

Begins on page 270

MATERIALS NEWS

For more data, circle item numbers you want on Reader Service Card.

MATERIALS LITERATURE

211—Steel tubing. Mechanical properties, uses, dimensions, weights, shipping details, and test pressures of steel pipe are listed in this 28-page booklet (WS 275). It also describes construction uses of steel tubing. *Wheeling Steel Corp.*

212—Industrial lubricants. This 16-pager outlines characteristics and purposes of more than 60 different kinds of industrial lubricants. It also outlines the producer's free industrial lubrication counseling service. *Pure Oil Co.*

213—Water treatment. Sulfonated polystyrene cation exchanger for industrial plants is described in this 12-page guide. Ionac C-240 softens water and removes and recovers metallic cations from solution. *Ionac Chemical Corp.*

214—Anti-corrosion resins. Booklet (16 pages) describes tests on the resistance of three polyester resins to various chemically corrosive solutions. Curves show strength retention of the various resins. *Atlas Chemical Industries, Inc.*

215—Alloys. This 4-page brochure on high permeability alloys contains tables and graphs on cycle loss data and a new approach to core loss calculations. Describes selection and use of test methods. *Magnetic Metals Co.*

216—Reflective insulation. Vapor barrier materials for maintaining controlled temperature spaces are described with graphs, tables, and application photos in this 12-page booklet. *Alumiseal Corp.*

217—Vacuum metallizing. Here's a 16-pager (No. 584) that explains a simple low-cost method of depositing layer of metal on prepared surfaces of glass, plastics, metal or paper. *F. J. Stokes Corp.*

FACTORY

For product finishers another new from Binks

New compact PUMP for airless spray painting

now spray direct from 55-gal. drums

This new Binks Model 41-8881 compact pump mounts directly into the bung of original 55-gallon containers . . . eliminates the cost of transferring material to another container before spraying.

The pump is designed for single gun airless spraying of protective and decorative coatings. All parts—which come in contact with the fluid being sprayed—are made of non-corrosive stainless steel. Parts subject to wear are of a special, hardened stainless steel.

Binks airless spraying gives you the speed and coverage of spray painting with minimum overspray—paint goes where you want it . . . on the surface . . . not into the air. Drift is greatly reduced, making this equipment ideal for use indoors or out. Result: considerable savings in both time and materials.

Bulletin A41-24 tells all . . . Ask your Binks distributor for a copy. He also can give you complete information on Binks pumps best suited to your operation. Or, write to the address below.

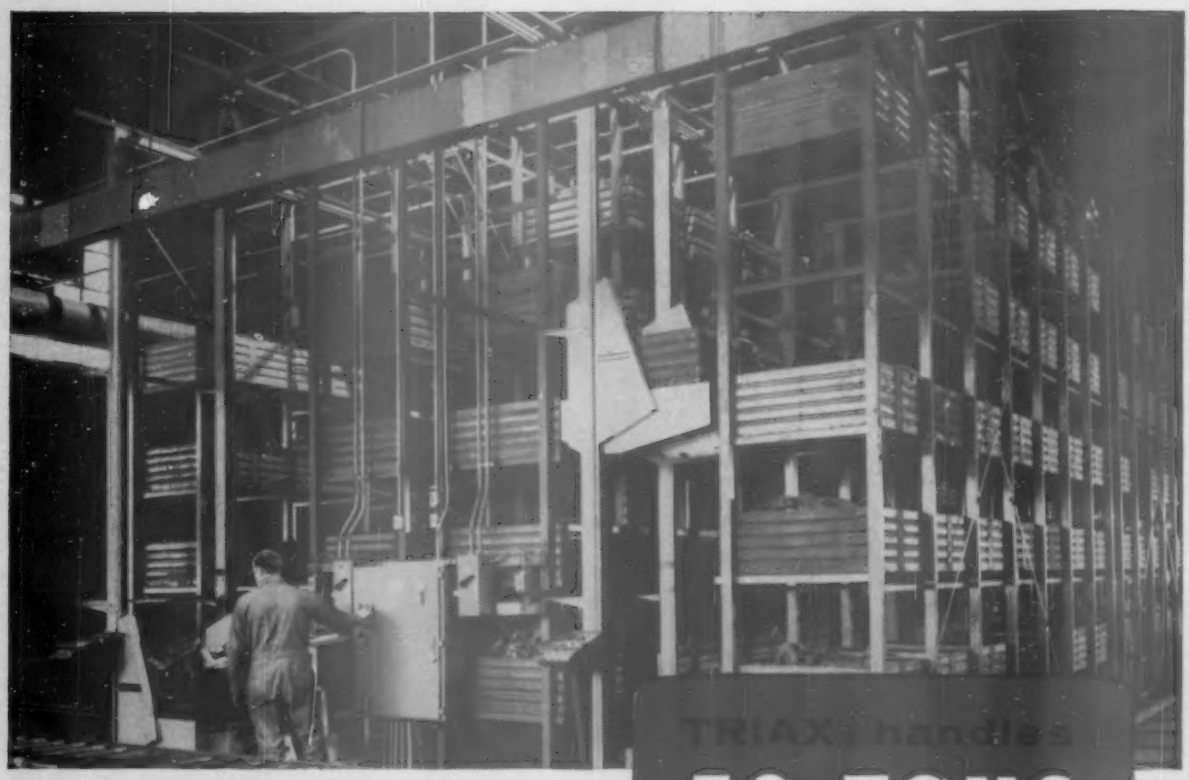
Ask about our spray painting school. Open to all . . . NO TUITION . . . covers all phases.

Binks Manufacturing Company 3146 Carroll Avenue, Chicago 12, Ill.

REPRESENTATIVES IN PRINCIPAL U.S. & CANADIAN CITIES • SEE YOUR CLASSIFIED DIRECTORY 1339

Binks Everything for spray painting

For more facts Circle 576 on Reader Service Card



One man, operating two TRIAX "Retriever" units, moves up to 50 tons of partially finished castings per 8-hour shift in or out of storage.

TRIAX handles

50 TONS

OF CASTINGS

A DAY

Automatically!

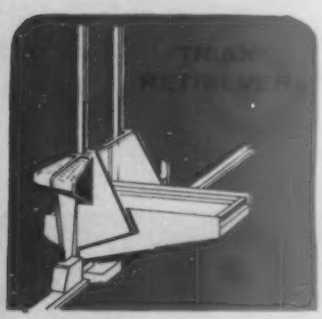
SAVES SPACE — SAVES LABOR
ALL LOADS QUICKLY AVAILABLE

At the Marion Malleable Iron Works, Marion, Indiana, TRIAX Retrievers were installed to fulfill several different needs . . . to save time and labor, to save space, and to establish an accurate method of inventory control.

Now, one man can store or remove loaded boxes of castings from any one of 520 storage openings in an average cycle time of 2½ minutes by setting a few simple pushbuttons.

Estimates in savings of time and labor run to 33% each and an index card file tells the operator exactly which castings he has in storage. Production orders can be filled quickly and accurately.

In other TRIAX installations, Retrievers are being used to store tools and dies, electric motors, sub-assemblies and finished parts, huge rolls of plastic film and other types of products. We would welcome the chance to discuss the advantages of a Retriever for your plant or warehouse.



THE TRIAX COMPANY

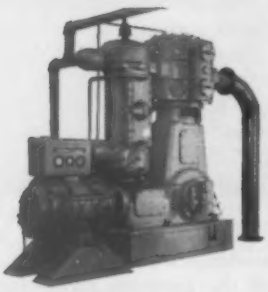
KEnmore 1-5630

1361 CHARDON ROAD • CLEVELAND 17, OHIO

For more facts Circle 577 on Reader Service Card

Which... ATLAS COPCO COMPRESSOR

meets your needs best?



AR Heavy-Duty Compressors

More air per horsepower than any comparable compressor! For continuous, full-load operation. "L" angle, 2-stage, double acting. Water cooled. Standard models provide 382 to 3210 cfm free-air delivery at 100 psi; only 76-590 hp required! (Can be supplied for other working pressures on request.)

What's your compressor requirement? Need an installation large enough to provide air for all your needs? Or would a small, compact unit for auxiliary operation solve your immediate problem? Either way—and for a wide range of applications between these extremes—Atlas Copco has the compressor for you!

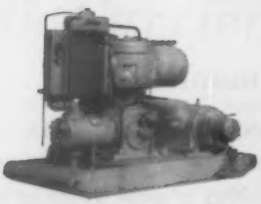
No matter which you choose, you'll get these proven advantages from Atlas Copco:

(1) More air per horsepower—less power consumption than other comparable units!

(2) Really low maintenance (one example—$3.10 after 10,000 hours' operation)!

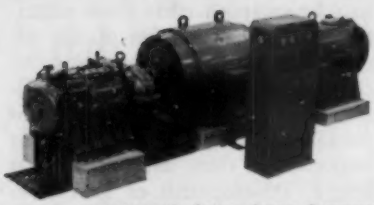
(3) Specifications are guaranteed free-air delivery—you get exactly what you order!

Get all the facts now—and compare! The coupon below will bring you a free catalog. (No obligation, of course.)



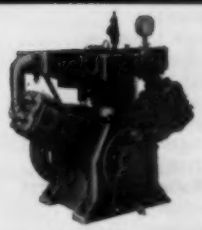
AR-L Heavy-Duty Compressors

Same basic construction as the AR Series, but provided with an air-cooled intercooler and air-cooled radiator for the cylinder water. Fan on compressor flywheel cools radiators. Perfect for arid areas or where difficult to bring in water. Both stationary and skid-mounted models available.



TWIN-AIR Rotary Screw Compressors

Brand new! "Twin-Air" Compressors offer capacities from 6,900 to 19,400 cfm at working pressures up to 115 psi. And, you get completely *oil-free* delivery of air or gas, since no lubrication is required — timing gears maintain small clearances between precision-mounted rotors, eliminating friction (and the necessity of oil) in compression chamber.



CT Air-Cooled Compressors

Stationary, or skid-mounted compressors for use where air demand is between 50 and 300 cfm. Totally air-cooled. Cylinder arrangement designed for smooth, vibration-free operation. Compact, rugged—for continuous, 24-hour trouble-free service. Highly efficient; low on maintenance costs.

ER-6 Heavy-Duty Compressors

New! Fundamental improvements over conventional heavy-duty compressors reduce power requirements (18.3 hp/100 cfm at 100 psi, full load); provide totally enclosed design; and save on floor space. Capacities to 1,140 cfm; standard instruments and safety devices.

ATLAS COPCO
Dept. F-5, 545 Fifth Avenue,
New York 17, N.Y.

Gentlemen:
Please send me ☐ Short-form catalog ☐ Detailed information on the_____Series

Name_____ Title_____

Firm_____

Address_____

City_____ Zone_____ State_____

Atlas Copco

610 Industrial Avenue
Paramus, New Jersey
COlfax 1-6800

930 Brittan Avenue
San Carlos, California
LYtell 1-0375

For more facts Circle 578 on Reader Service Card

FREE TO COMPANY OFFICIALS LOOKING FOR A NEW PLANT SITE

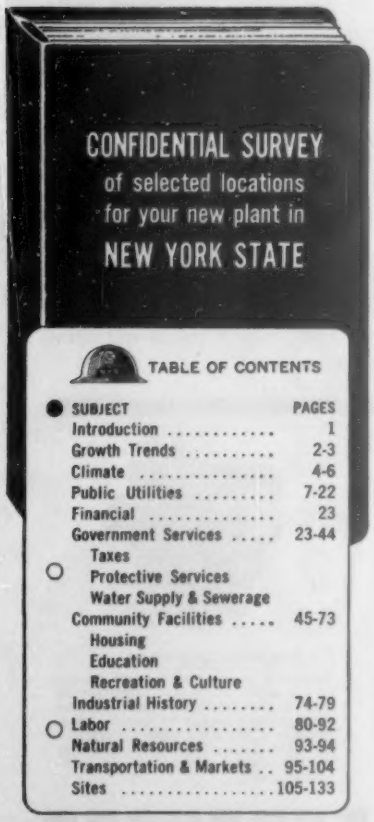


TABLE OF CONTENTS

SUBJECT	PAGES
Introduction	1
Growth Trends	2-3
Climate	4-6
Public Utilities	7-22
Financial	23
Government Services	23-44
Taxes	
Protective Services	
Water Supply & Sewerage	
Community Facilities	45-73
Housing	
Education	
Recreation & Culture	
Industrial History	74-79
Labor	80-92
Natural Resources	93-94
Transportation & Markets	95-104
Sites	105-133

TAILOR-MADE REPORTS. The table of contents shown above is typical of the survey of selected plant locations that we will prepare for your organization. Simply send your specific requirements on your business letterhead to Commissioner Keith S. McHugh, New York State Department of Commerce, Room 4407, 112 State Street, Albany 7, N. Y.

Keith S McHugh

Keith S. McHugh, Commissioner
New York State Department of Commerce

BOOKS

Hitting plant costs a new way

Today's management cannot afford to overlook any new technique that will reduce manufacturing costs by 15 to 25%. Therefore, this text, *Techniques of Value Analysis and Engineering*, is "must" reading for plant management.

The basic assumption of value analysis is that product design can be improved costwise. It is predicated on the fact that today's business pressures require the designer to satisfy many complicated specifications within a short time. This prevents the perfect design from being achieved. Details are often overlooked and alternatives not sufficiently researched. Value analysis does not seek to change this. Instead, it seeks to interpose itself as a friendly audit upon the economics of the final design. Results indicate that specialists trained in this type of audit ferret out significant cost reductions with minimum expense.

The techniques of the value audit are presented in this book. They may be summarized in three principles: (1) identification of the design function, (2) evaluation by comparison, (3) development of alternative designs or methods of manufacture. Item 3 is the most important of these and is treated at length. Development of alternative designs of merit can be a time-consuming process. Herein may lie the only weakness of this technique. But the author recommends the use of 13 specific tools to make this search most productive. Significant is the use of vendor's skills and knowledge. Frequently, these can provide the quickest means of obtaining cost-reducing alternatives.

An important point is made about the proper accumulation of alternative cost records. Master files so compiled can substantially reduce research time when developing design alternatives.

The remainder of the text describes the organizing and training of a value-analysis staff. The author, L. D. Miles, presents the pros and cons of having this department report to purchasing, manufacturing, engineering or sales. He leaves the decision to the reader. Similarly, he discusses various staff sizes and their internal relationships.

Copious examples throughout the book illustrate five-figure dollar savings repeatedly gained by a value analysis program. But Miles, the originator of this management tool, stresses that general publication of actual savings should not be made in the plant. This can only cause embarrassment and prevent cooperation. Good will is a necessary environment for the program to flourish.

The author achieves sufficient balance between technique and philosophy. The reader will gain not only knowledge but wisdom on how to install the program successfully. This alone makes the book worth reading at all management levels. (Reviewed by G. V. Schultz)

Techniques of Value Analysis and Engineering, by Lawrence D. Miles. McGraw-Hill Book Co., Inc., 330 West 42nd St., New York 36. 262 pages. $8.50.

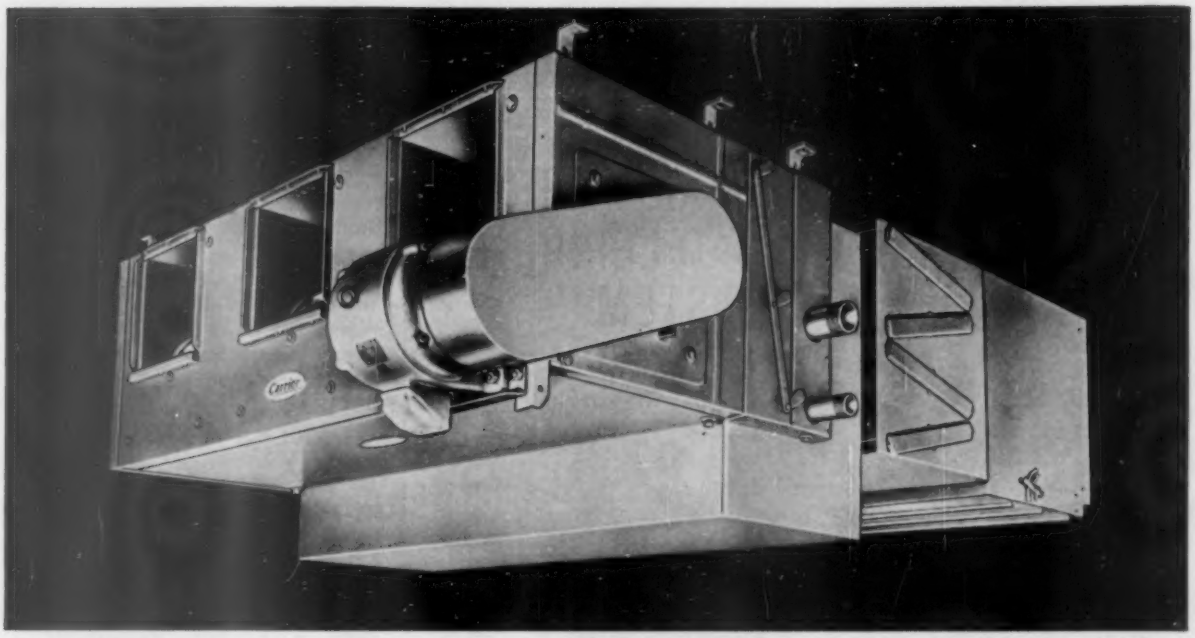
Two manuals on instrumentation

Industry is at last getting an adequate number of good books on instrumentation maintenance and theory. Mr. Kallen's book is a commendable combination of theory and practical servicing information on meters, controls, and regulators for pressure, temperature, flow, level, and gas analysis. Mr. Tyson's book, written with a light but interesting touch, will appeal to men new in instrument servicing who need a thorough grounding in instrument theory and construction.

Handbook of Instrumentation and Controls, by Howard P. Kallen, McGraw-Hill Book Co., 330 W. 42nd St., New York 36. 664 pages. $15.

Industrial Instrumentation, by Forrest C. Tyson, Jr., Prentice-Hall, Inc., Englewood Cliffs, N. J. 365 pages. $9.

Turn the page



Carrier 46PQRV Units have heating capacities ranging from 50,900 to 2,990,000 Btu per hour, air handling capacities from 1500 to 31,000 cfm. Base units arrive at job site factory-assembled, the accessories individually crated, for easy handling and installation.

YOU GET WIDE SELECTION FLEXIBILITY PLUS SUBSTANTIAL HEATING ECONOMY

with Carrier Heating and Ventilating Units!

For heating all types of large industrial and commercial buildings, Carrier 46PQRV Units offer many definite advantages. They are also ideally suited for heating "make-up" air to prevent infiltration of cold air around windows and doors. By maintaining positive building pressures, they effect substantial savings in operating costs. And, because of their wide flexibility of application, they offer an economical "tailor-made" installation.

How wide is this flexibility? Here are some examples:

- There's a complete choice of steam or hot water coils for each of seven basic unit sizes. This makes it practical and economical to match heating capacities to individual job needs.
- Fan sections, complete with V-belt drives and multiple outlets, permit a range of air handling capacities and discharge arrangements.
- Fan assemblies, designed to run well below their critical speeds, operate smoothly and quietly—either as free discharge units or with ductwork.
- There's also extreme flexibility in the selection of controls and accessories.

For complete information and Catalog 46PQRV111, write or call your Carrier representative listed in the Classified Telephone Directory under "Heaters—Unit" or write Carrier Air Conditioning Company, Syracuse 1, New York.

Carrier

Air Conditioning Company

CARRIER OFFERS EVERY TYPE OF EQUIPMENT FOR ANY JOB

Heating and Ventilating Units for steam and hot water | Unit Heaters for steam and hot water | Gas Unit Heaters and Duct Furnaces

For more facts Circle 580 on Reader Service Card

PAGING SERVICE

DuKane

ALL NEW 600 SERIES PAGING TELEPHONE SYSTEM

CONFERENCE SERVICE

ANNOUNCEMENTS

CALLS PARTY BY NAME—FREES OUTSIDE SWITCHBOARD FOR SALES PRODUCING CALLS

BACKGROUND MUSIC

- Outside switchboard and telephones free for outside sales producing calls.
- Call party by name. Direct person-to-person contact without outside switchboard relay. Find personnel, even when they are not at their desks.
- Instant internal communications at a nominal cost . . . outside switchboard free of congestion.
- Receive important information . . . contact key personnel without leaving your desk.
- Easily expandable from two channel to three channel system. Additional telephones added as requirements merit.
- Simple to use . . . no complicated coded dialing system . . . no flashing the switchboard operator.
- Time and money saved through increased efficiency.
- Optional AM/FM music or program source improves working atmosphere, raises morale . . . increases employee efficiency.
- Lease or lease-purchase plans providing for eventual ownership on terms most favorable to you.

SHIPPING ORDERS

NATIONWIDE NETWORK OF OVER 300 DUKANE FACTORY TRAINED SALES ENGINEERING DISTRIBUTORS WILL BE HAPPY TO GIVE YOU FULL DETAILS. LOOK FOR THE DISTRIBUTOR NEAREST YOU IN THE YELLOW PAGES.

WRITE FOR BULLETIN!

DuKANE
CORPORATION
COMMERCIAL SOUND DIVISION
DEPT. F-111 / ST. CHARLES, ILLINOIS

Begins on page 280

BOOKS

Better communication. How do you prepare for plant meetings? Are you communicating effectively? What should go into technical society presentations? This handbook answers these and many more questions on how to achieve effective group communication. Chapters cover chart presentations, how to make your own charts, salesmen's visuals, slides and slidefilms, and magnetic magic. The book's hundred or so photographs and drawings help to spell out quickly and effectively what you should and shouldn't do to gain and keep an audience.

Visual Presentation Handbook, by Jean De Jen. I.C.R. Corp., 281 State St., New London, Conn. 101 pages, $3.50 cloth, $1.25 paper.

Mnemonic magic. A bad memory can embarrass you and the people you work with. In this book David Roth tells why you forget so much of what you should remember and how to remedy the situation. He tells how to have a top memory and how to cash in on it business wise and socially. If you have a memory like a sieve, this book is for you.

Roth Memory Course, by David M. Roth. Motivation, Inc., Springdale, Conn. 290 pages. $3.95.

Key to efficiency. Despite automation and improved production techniques, the supervisor is still the key to efficiency. The book takes heed of this and demonstrates how the supervisor's efficiency can be increased through better employee relations. This useful reference manual for foremen can also be used as a text for foremanship and supervisory training sessions.

Successful Supervision. Motivation, Inc., Springdale, Conn. 84 pages. $1.50.

Emergency lighting. Anyone involved in building construction, design, or rehabilitation will find this handbook valuable. It provides basic information on installation, equipment specifications, and maintenance requirements. A chart shows individual state requirements.

Emergency Lighting Handbook. Electric Cord Co., 432 Plane St., Newark 2, N. J. 96 pages. $2.

For more facts Circle 581 on Reader Service Card

British Admiralty chart of New York harbor (1775) reproduced on Kodagraph Contact Film, Estar Base. Courtesy of New-York Historical Society.

Surest course to take in drawing reproduction!

Choose from Kodak's great new line—Kodagraph Reproduction Films, Estar Base

As a draftsman or engineer, there's a selfish reason for asking your reproduction department or local blueprinter to make your "second originals" on new Kodagraph *Estar Base* films: *You'll find them much easier to work with!*

In addition to being as durable and dimensionally stable as any film you can name, Estar Base prints have clean backgrounds, more contrasty images, *and a superior drafting surface on both sides.* You can draw with light strokes . . . use pencils with a wider range of hardnesses. And since there's less abrasive action, pencil points stay sharper longer. Also, detail stays put . . . is less inclined to smear, can be erased easily. See for yourself. Ask your reproduction department or local blueprinter for second originals on Kodagraph Estar Base film.

1. Kodagraph Autopositive Film, Estar Base. First choice for general reproduction work. Gives you same-size *positive* second originals *directly.* Excellent results obtained with print-through or reflex printing (even from metal templates). Can be exposed and processed in room light.

2. Kodagraph Contact Film, Estar Base. Ideal for making same-size reproductions from film or low-cost paper negatives of old or weak line drawings. Job's this easy: Expose in standard contact printers . . . process with paper or litho developers.

3. Kodagraph Projection Film, Estar Base. Welcome change-of-scale "specialist." This high-contrast, quick-processing film gives you sharp and clean results when enlarging microfilm negatives, or reducing large drawings, blueprints, maps. Can be handled with 1A (red) or OA (yellow) safelight.

For further details, write to Eastman Kodak Company, Graphic Reproduction Division, Rochester 4, N.Y.

NEW! **Kodagraph**

REPRODUCTION FILMS

for best line-for-line reproduction

For more facts Circle 582 on Reader Service Card

Talk Two-Way

• on your job
• in your car
• in your office

PERSONAL-COM 300
Hand-Held 2-Way Radio

Rugged, dependable, fully transistorized 27-megacycle portable 2-way radio, designed specifically for business and industrial uses. Small and light, weighs less than one pound. Has 11-volt mercury battery for 50 hours' operation. Factory-installed plug-in module available to increase transmit power.

MARK VII "Top-of-the-Line"
Citizens' Band 2-Way Radio

Short-range communications facilities for business service and personal needs. Ideally suited for use on materials handling vehicles, or for 2-way conversation between fixed points. Also serves as excellent base station for hand-held radio. 6 or 12 V DC or 115 V AC operation.

LOW-COST INTERCOM

A complete line of quality Intercoms—wired, or wireless—designed for office, factory or home use, at lowest prices. Suitable for many applications, from simple wireless 2-way talk-listen systems to flexible, multi-unit systems with a variety of talk-listen-monitor options.

Send coupon for complete information.

RCA
The Most Trusted Name in Electronics
RADIO CORPORATION OF AMERICA

RADIO CORPORATION OF AMERICA
Special Products Department
Dept. B-433, Meadow Lands, Pa.
Please send me complete information on the following:
☐ RCA PERSONAL-COM 300
☐ RCA Mark VII ☐ RCA Intercom

NAME _____
TITLE _____
FIRM OR ORG. _____
ADDRESS _____
CITY _____ ZONE _____ STATE _____

Circle 583 on Reader Service Card

Data sources for INDIRECT COSTS

Pages 82-83

"Prices and Costs in Manufacturing Industries," Study Paper No. 17, Joint Economic Committee of the U.S. (January 1960).

"1959 Supplement," *Monthly Labor Review*, U.S. Department of Labor, Bureau of Labor Statistics (November 1960).

Pages 84-85

"Trends in Output per Man-Hour in the Private Economy," 1909-1958, Bulletin 1249, U. S. Department of Labor (September 1960).

Page 87

"Manpower Yardsticks," FACTORY (September 1957).

"Road Maps to Industry #1306," National Industrial Conference Board, 1960.

Page 88

"Special Report of the Census of Manufactures MC58 (1)-D11-1," U. S. Bureau of the Census (December 1960).

"Survey of Material Handling in Atlanta," FACTORY (November 1960).

Page 89

"Trends and Structure of White-Collar Employment," *Monthly Labor Review* (January 1961).

American Society for Industrial Security, Washington, D. C.

"Accident Facts—1960," National Safety Council, Chicago.

Page 90

"The New Approach to Quality Control," by A. V. Feigenbaum, FACTORY (March 1957, updated by staff interview in May 1961).

"Manpower Yardsticks, FACTORY (September 1957).

"Trends and Structure of White-Collar Employment," op. cit.

Page 91

"Cost Index of Plant Maintenance," FACTORY (January 1954 to June 1961).

"Trends in Output per Man-Hour in the Private Economy," op. cit.

For general statistical information and consultation, Department of Economics, McGraw-Hill Publishing Company, New York.

LET'S COME DOWN TO EARTH
on this
Plant Location Business

No area can be all things to *all* industries. But we've got down-to-earth facts that prove the Toledo-Northwestern Ohio area is right for these specific industries:

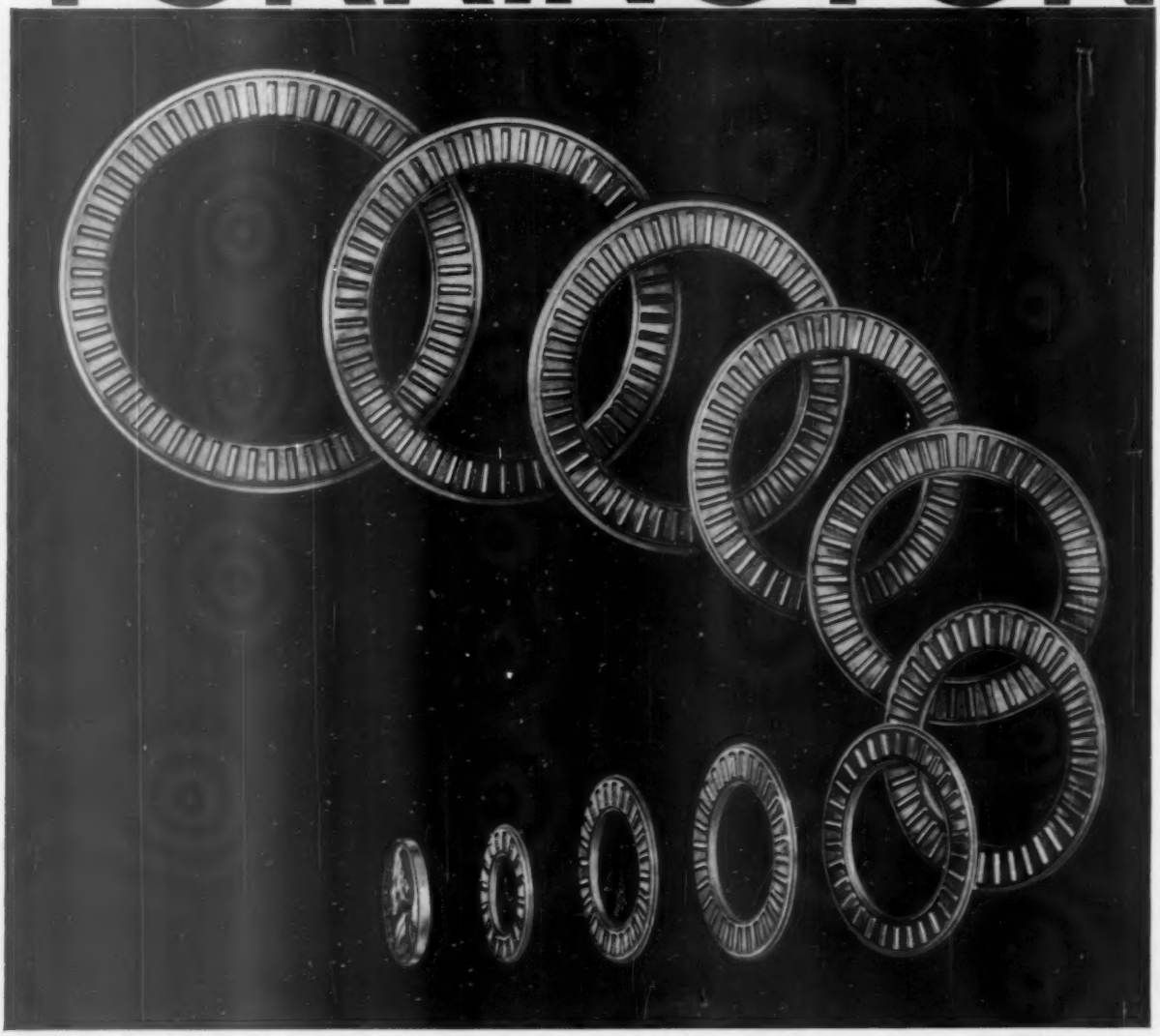
PAPER AND PLASTICS PRODUCTS
BUILDING AND STONE PRODUCTS
FOOD PROCESSING • CHEMICAL PROCESS
MACHINERY PRODUCTION
PRIMARY METALS • ELECTRONICS

These facts are reported in a study of the area by Fantus Research, Inc., one of the nation's foremost industrial location services. For more information, write R. E. Johnson, Manager, Industrial Development Department, The Toledo Edison Company, Toledo 1, Ohio.

THE TOLEDO EDISON COMPANY
an investor-owned electric light and power company serving Northwestern Ohio

Circle 584 on Reader Service Card

TORRINGTON



SEE WHAT YOU GET IN A BEARING NO THICKER THAN A NICKEL

Torrington Needle Thrust Bearings offer true anti-friction operation, high thrust capacity, wide size range, low unit cost...all in a unit no thicker than a nickel or ordinary thrust washer.

That's not all! These exceptional bearings have an O.D. much smaller for a given shaft size than any other type of thrust bearing. You can run them on hardened and ground surfaces, or on standard races. They're completely self-contained . . . can be easily handled and installed.

Remember Torrington Needle Thrust Bearings next time you need better performance in a restricted space. Call or write us for more information.

RACES IF YOU WANT THEM
Standard races are available. Otherwise Torrington Needle Thrust Bearings may be run directly on hardened and ground adjacent surfaces.

progress through precision **TORRINGTON BEARINGS**

THE TORRINGTON COMPANY Torrington, Connecticut • South Bend 21, Indiana

2-A, 16-B:C
10-POUND

3-A, 20-B:C
20-POUND

NEW KIDDE TRI-CLASS-ABC UNITS APPROVED FOR A, B, C, FIRES!

U.L.-approved for use on all three classes of ordinary combustibles, flammable liquids, and electrical fires, new 10 and 20-pound Kidde dry chemical portables now simplify the job of fire-fighting, eliminate the possibility of error in matching the extinguisher to the fire hazard. Both make the job of training personnel easier, since they feature simple, two-step operation. Just aim, and pull the trigger . . . fire is smothered in seconds.

Tops in performance and quality, pressurized Kidde Tri-Class-ABC 10 and 20-pound portables release a powerful, non-turbulent dry chemical stream to insure dependable, fast-acting fire protection. Simple recharging means that once used, your units are quickly put back in service. In addition to full U.L. approval, both units are approved by Factory Mutual Laboratories. For more information on these easy-to-use portables, write to Kidde today!

Kidde

Industrial and Marine Division

Walter Kidde & Company, Inc., 1132 Main St., Belleville 9, N. J.

FILMS

Numerical Control: A Computer Approach to Manufacturing Flexibility explains how a small solid-state computer prepares programs for numerically controlled machine tools. Programs can be "written" for machine tools controlled by punched cards, and punched or magnetic tapes. Shows how even small job shops can benefit from numerical control. 16mm, sound, color, 10 min. For loan, write:

Remington Rand Univac, 315 Park Ave. South, New York 10.

Satisfying the Salaried Employee pinpoints specific areas of employee dissatisfaction and presents practical solutions to such problems as status, recognition, compensation, communications, and supervision. Includes two color-strip films, leader's guide, two-sided record synchronized to films, booklets. 35mm, sound, $22.50. Write:

National Assn. of Manufacturers, 2 East 48th St., New York 17.

The F5 in Action demonstrates the many advantages of strapping heavy hot-steel coils with a new fully automatic steel strapping machine. A comparison sequence illustrates how the remote-controlled operation can double coil-strapping output. 16mm, sound, color, 14 min. For loan, write:

Acme Steel Products Div., 135th St. & Perry Ave., Chicago 27.

The Prevention and Control of Distortion in Arc Welding is a Walt Disney film which "stars" a character who symbolizes the shrinkage forces present when molten weld-metal cools and contracts. Tells how Mr. Shrink can be defeated by the application of a few simple principles. 16mm, sound, color, 20 min. For loan, write:

Association Films, Inc., Broad at Elm, Ridgefield, N. J.

The Challenge of Ideas appraises the present contest between Democratic and Communist ways of life. Discusses their basic differences and the hopes and fears of a free world. 16mm, b&w, sound, 31 min. $65.64. Write:

Govt. Film Dept., United World Films, 1445 Park Ave., New York.

For more facts Circle 586 on Reader Service Card

CAN YOU MEASURE MORALE?

Employee morale—its effect on workmanship and production—can be measured in dollars and cents on your balance sheet. And dust is a silent thief of morale wherever it causes undesirable working conditions. But Pangborn Dust Control Equipment keeps employee morale and efficiency high.

Pangborn Dust Control Equipment gives you more than added efficiency. Removing abrasive or corrosive dust extends machinery life, eliminates health hazards, cuts housekeeping costs, builds better community relations. And reclaimed dust can be as valuable to you as money in the bank.

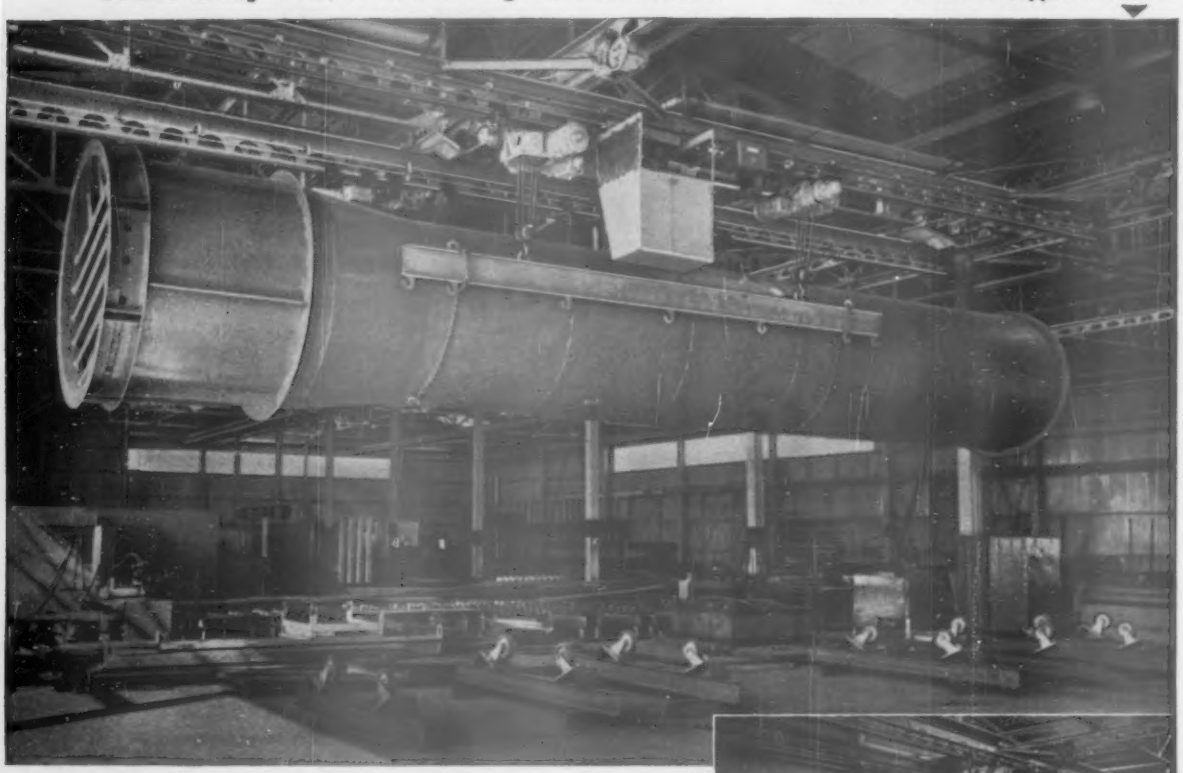
Pangborn makes Dust Control Equipment for your every need: Cloth Bag, Tube, and Screen Collectors in Self-Cleaning and Unit Types, also Wet Collectors in all sizes. For more information, write:

Pangborn Corporation, 2100 Pangborn Blvd., Hagerstown, Md.; Pangborn Canada Ltd., 47 Shaft Rd., Toronto (Rexdale), Canada; or phone district office in Yellow Pages, "Dust Collecting Systems."
Manufacturers of Dust and Fume Control Equipment; Blast Cleaning, Vibratory Finishing; Rotoblast® Steel Shot and Grit®.

Pangborn
OF HAGERSTOWN

HUGE STACK HANDLED
with Light Tramrail Cranes

Two Standard Cleveland Tramrail Cranes Make Easy Job of Handling 11 Ton Stack



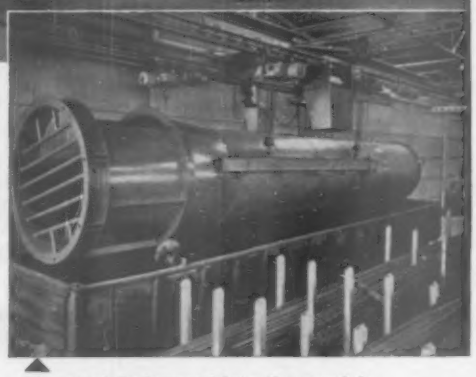
Two cab-operated Cleveland Tramrail cranes working together lift 11 ton stack. Each crane has two 5000 lb. electric hoists handling a spreader beam. Chains between the beams support the stack.

Cleveland Tramrail cranes are versatile in operation and offer handling advantages not normally possible with other forms of conveyance. They can be used to overcome difficult handling situations which occasionally arise and otherwise would be very difficult and costly.

The handling of a heavy stack made by Central Texas Iron Works Co., Waco, Texas, with two of their Cleveland Tramrail cranes, offers a good illustration. The cranes operate on the same three-track runway in one bay of the shop, are cab-operated and rated for five ton loads. Their principal function is handling large steel plates, bundles of reinforcing rod and various structural items.

The handling of the stack, nearly 50 feet long, weighing 11 tons, was not contemplated when the Tramrail crane installation was planned. Yet by working the two cranes together, the stack was easily lifted from the area where it was fabricated, moved a long distance in the shop high over various equipment on the floor and lowered into a gondola car at the end of the building. Despite the slight overload, the cranes moved the stack very smoothly.

For maximum materials handling flexibility, as well as efficiency, it will pay you to look into the possibilities of Cleveland Tramrail cranes.



The stack is lowered into the gondola car gently and accurately.

"WE ARE SOLD ON CLEVELAND TRAMRAIL"

Central Texas Iron Works writes:

"We are sold on Cleveland Tramrail because you build good equipment and because you are represented in Texas by a very fine dealer who is interested in helping us solve our material handling problems most economically rather than just trying to make another sale."

(May we add that all Cleveland Tramrail distributors have the same business philosophy).

Write for free booklet No. 2008

CLEVELAND TRAMRAIL

Overhead Materials Handling Equipment

CLEVELAND TRAMRAIL DIVISION · THE CLEVELAND CRANE & ENGINEERING CO. · 3262 E. 290 ST. · WICKLIFFE, OHIO

For more facts Circle 588 on Reader Service Card

Richard Branch, superintendent at Red Rock Quarry, Nesquehoning, Pa.

"Since installation in July, 1960 . . .

Constant, Heavy Impact Hasn't Stopped Our General Electric Polydyne® Drive"

"Since we installed a General Electric Polydyne mechanical adjustable-speed drive on our Universal Wobbler Feeder, we haven't had a moment's downtime due to malfunction since July, 1960," says Richard Branch, superintendent at Red Rock Quarry, Nesquehoning, Pa.

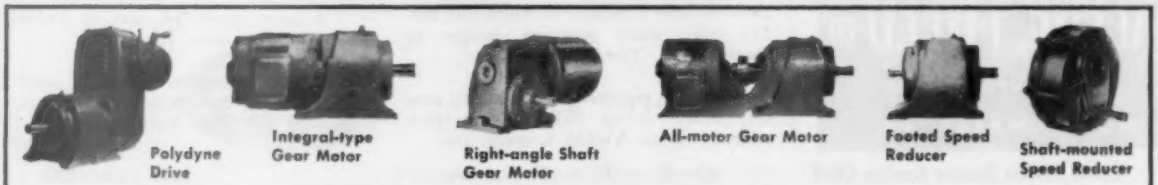
The wobbler's elliptical bars convey large rocks to a crusher and let fines and dirt drop through to another conveyor. The rock is unusually hard sandstone, which stratifies into large, thin pieces. This type of material creates a tremendous strain on the drive unit during initial impact and separation.

"THE FORMER DRIVE cost us $2,939 in maintenance and eight days' lost production during the year and a half we used it," continues Mr. Branch. "General Electric's Polydyne Drive is 15 horsepower, same capacity as the old one, but it's physically larger and much stronger. It has proved itself an excellent solution for our tough operating conditions."

When your application requires low-cost adjustable speed, reliability, and ease of maintenance, investigate General Electric Polydyne Drives. Ask your G-E Sales Engineer or write for bulletin GEA-6806, Section 854–07, General Electric Co., Schenectady 5, N. Y.

GENERAL ELECTRIC

GENERAL ELECTRIC OFFERS A COMPLETE LINE OF LOW-SPEED DRIVES, 1/8 TO 200 HP



For more facts Circle 589 on Reader Service Card

There is a good chance you will see your Palmetto® Representative today—whether you are ordering packings or not.

For maintenance use, Palmetto is offered exclusively through the industrial distributor—a local businessman who supplies many other products you use and is familiar with your particular operation.

This experienced, local service is the bonus you receive when you specify *Palmetto*—industry's standard of quality packing!

FOR EXAMPLE

To seal against highly corrosive acids or alkalis: Palmetto offers 6 different styles of braided asbestos packing impregnated with low-friction, chemically inert TEFLON* suspensoid . . . and new CF pure TEFLON FILAMENT PACKING.

Your Palmetto distributor is best suited to guide your selection, and he can fill your order—today.

Ask for Braided Packings Catalog BP, and for the name of your nearest Palmetto Distributor.

*E. I. du Pont de Nemours & Co. (Inc.) trademark for Polytetrafluoroethylene

PALMETTO PACKINGS

GREENE, TWEED & CO.

OUR 99TH YEAR

NORTH WALES, PA.

ADVERTISERS' LITERATURE

Offered in ads received up to 5th of last month for this issue. For items you want, circle numbers on Reader Service Card.

ELECTRICAL

275—Metallic tubing. Information on electrical tubing for future power demands. Republic Steel Corp.

276—Adjustable speed drives. Bulletin GEA-6806 describes low-cost compact equipment. General Electric Co.

277—Fuses. Booklet "Basic Protection For Electrical Power Systems" for selection help. Bussmann Mfg. Div.

278—Motor controls. Catalog on controls for preventing burnouts in all types a-c motors. Metals & Controls Inc.

BUILDING

279—Floor grating. Easy-to-use steel grating booklet gives facts, applications. Kerrigan Iron Works Co.

280—Flooring compound. Brochure FC-100 has data on liquid polymer-based mortars. Thiokol Chemical Corp.

281—Weed killer. Literature on dry granular weed killer. 1 to 2 lb. covers 100 sq. ft. U. S. Borax.

282—Plastic panels. Information, specifications on glass-fiber-reinforced panels and panes. Structoglas, Inc.

283—Grating. New catalog describes many safety features of fireproof Grip-Strut grating. The Globe Co.

284—Flooring materials. Data sheets on heavy-duty new construction, resurfacing, patching. The Flintkote Co.

PRODUCTION

285—Vibratory feeders. Descriptive catalog on line that feeds from ounces to many tons per hour. Eriez Mfg. Co.

286—Chart recorder marker. Literature describes round chart recorder inking system. The Esterbrook Pen Co.

287—Schedule boards. Details on visual control boards for greater productivity. Wassell Organization, Inc.

288—Sockets. Industrial catalog lists full line of hand and bench tools for many needs. Snap-On Tools.

289—Rivitor/Clinchor. Bulletins 646 and 555 offer many standard designs to choose from. Tomkins-Johnson.

290—Visible records. Want facts on time and money-saving Flexoline reference systems? Acme Visible Records, Inc.

291—Air-power devices. Spot-A-Mation idea file gives complete data, wiring diagrams, etc. Bellows-Valvair.

292—Visual control boards. This guide to control methods has full-scale, sample chart section. Rol-A-Chart.

293—Safety containers. Catalog of fire-safe products for handling flammable liquids. The Protectoseal Co.

294—Magnetic ferrous traps. Application data on protection for liquid processing equipment. Eriez Mfg. Co.

295—Drafting tape. Here's 32-page catalog of tape materials to help make drafting easier. Chart-Pak, Inc.

296—Industrial TV. Write for copy of helpful closed-circuit TV system-planning guide. Philco Corp.

297—Paint-spraying pump. Bulletin A41-24 on new compact pump for airless spray painting. Binks Mfg. Co.

298—Plier-type tools. Hand-tool catalog and case history book illustrates wide variety. Sargent & Co.

299—Indicating receiver. Booklet G-1200 on transmitter that indicates pressure, etc. Johnson Service Co.

PLANT SERVICES

300—Unit heaters. Bulletin HR-6A on steam, hot water, high-temperature revolving heaters. L. J. Wing Mfg. Co.

301—Door heaters. Bulletin DH-2B gives facts on door heaters. Available in 10 sizes. L. J. Wing Mfg. Co.

302—Plant protection. Security brochure tells about plant services. Pinkerton's National Detective Agency.

303—Work benches. Catalog lists full line with interchangeable accessories. Columbia-Hallowell Div. SPS.

304—Water coolers. Booklet illustrates 19 distinctive models in pressure or bottle types. The Ebco Mfg. Co.

305—Plant protection. Information on centralized control panel for plant security. Minneapolis-Honeywell.

306—Air handlers. Literature on new line—37 different units, 14 sizes, to 44,000 cfm. Acme Industries, Inc.

307—Air conditioning. Complete information on package air conditioning, refrigeration units. Bell & Gossett Co.

Turn the page

Here's 0.1° Sensitivity at a Competitive Price!

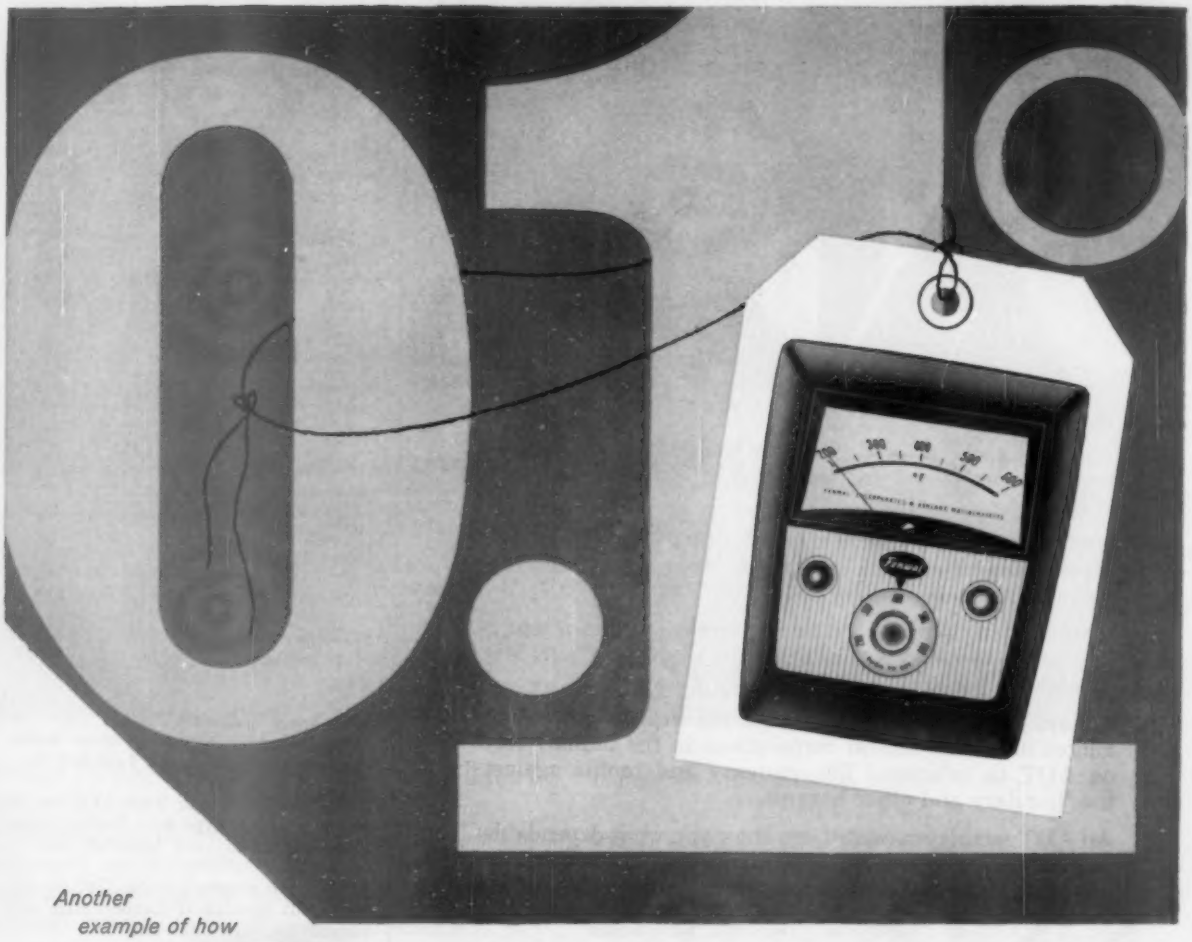
... Fenwal's New "561" Temperature Controller

The new "561" indicating controller responds to temperature changes of 0.1° or less! And is yours at a competitive price! These two features alone make it an instrument you should investigate ... but there's more!

You can choose from five standard temperature ranges ... within the span of −50 to 600°F. Furthermore, scales start and end within *your* ranges, permitting larger graduations, better legibility, easier readout. And control and indication are separate but simultaneous. *Should your indication fail the "561" will continue to control with complete accuracy.*

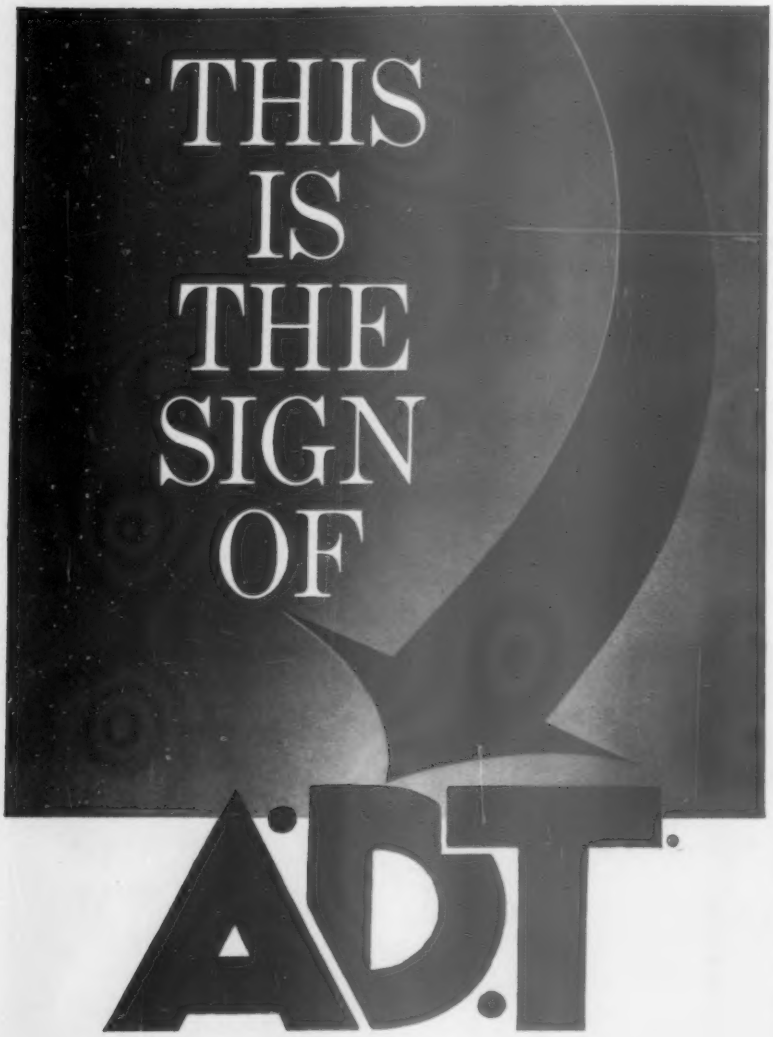
Take your application and then take your choice! The "561" offers you the option of either ON-OFF or proportioned temperature control ... has 10 AMP/120 VAC relay capacity. This precise instrument gives unvarying performance. Its indication and control will not vary with fluctuations of input voltage nor changes in ambient temperature. Smartly styled to complement modern industrial machines and interiors, *the "561" offers you all these extras at a competitive price.*

A Fenwal engineer will be glad to supply information on the "561", or any other temperature control in Fenwal's broad line. Write Fenwal Incorporated, 2511 Pleasant Street, Ashland, Massachusetts.



Another example of how

Fenwal CONTROLS TEMPERATURE ... PRECISELY



. . . and it spells *security* for more than 55 billion dollars' worth of commercial and industrial properties from coast to coast.

First in its field for more than 87 years, ADT offers the widest range of electric protection services to meet the toughest security requirements.

Combinations of these automatic services can give you a greater degree of plant security than outdated and less dependable methods — often at *less cost!*

Today, more than 70,000 service subscribers (including almost all of the largest corporations in the nation) rely on ADT to safeguard life, property and profits against fire, burglary and other hazards.

An ADT security specialist can show you what dependable protection really means. Call him today—he's listed in your telephone book—or write our executive office for an illustrated folder (Canada and U.S. only).

AMERICAN DISTRICT TELEGRAPH COMPANY
Executive Office: 155 Sixth Avenue, New York 13, N. Y.
A NATIONWIDE ORGANIZATION

ADT

Begins on page 290

ADVERTISERS' LITERATURE

Offered in ads received up to 5th of last month for this issue. For items you want, use Reader Service Card.

308—Compressors. Short-form catalog describes complete line of stationary compressors. Atlas Copco.

309—Compensation insurance. Booklet "Closing the Gaps in Your Business Insurance Protection." American Mutual.

310—Activated charcoal. Bulletin T-381 covers filtering agent for air, gases, liquids. Barnebey-Cheney Co.

311—Dust filter. Booklet G-30 is filled with facts, specifications, and dimensions. The Day Co.

312—Heating, ventilating units. Catalog 46PQRV111 gives specifications, other data. Carrier Air Conditioning Co.

313—Plant protection. Folder tells about burglar and fire alarm service. American District Telegraph Co.

314—Air handling. Bulletin 522 on dual-purpose air supply, exhaust. Applications unlimited. Clarage Fan Co.

315—Christmas decorations. Catalog shows line of illuminated outdoor decorations. General Plastics Corp.

MECHANICAL

316—Multi-V, multi-wedge drives. New catalogs will help you reduce number of belts, etc. Worthington Corp.

317—Couplings. Bulletin 4100 on steel torsionally resilient couplings in 34 sizes. The Falk Corp.

318—Speed reducers. Catalog 2747 on gearmotor. Motogear types in double, triple, quadruple reductions. Link-Belt Co.

319—Speed reducers. Folder 2724 covers universal worm gear type to 14.8 hp. Ratios, 5:1 to 60:1. Link-Belt Co.

320—Speed reducers. Book 2824 on worm gears for high-ratio speed reduction—right-angle take-off. Link-Belt Co.

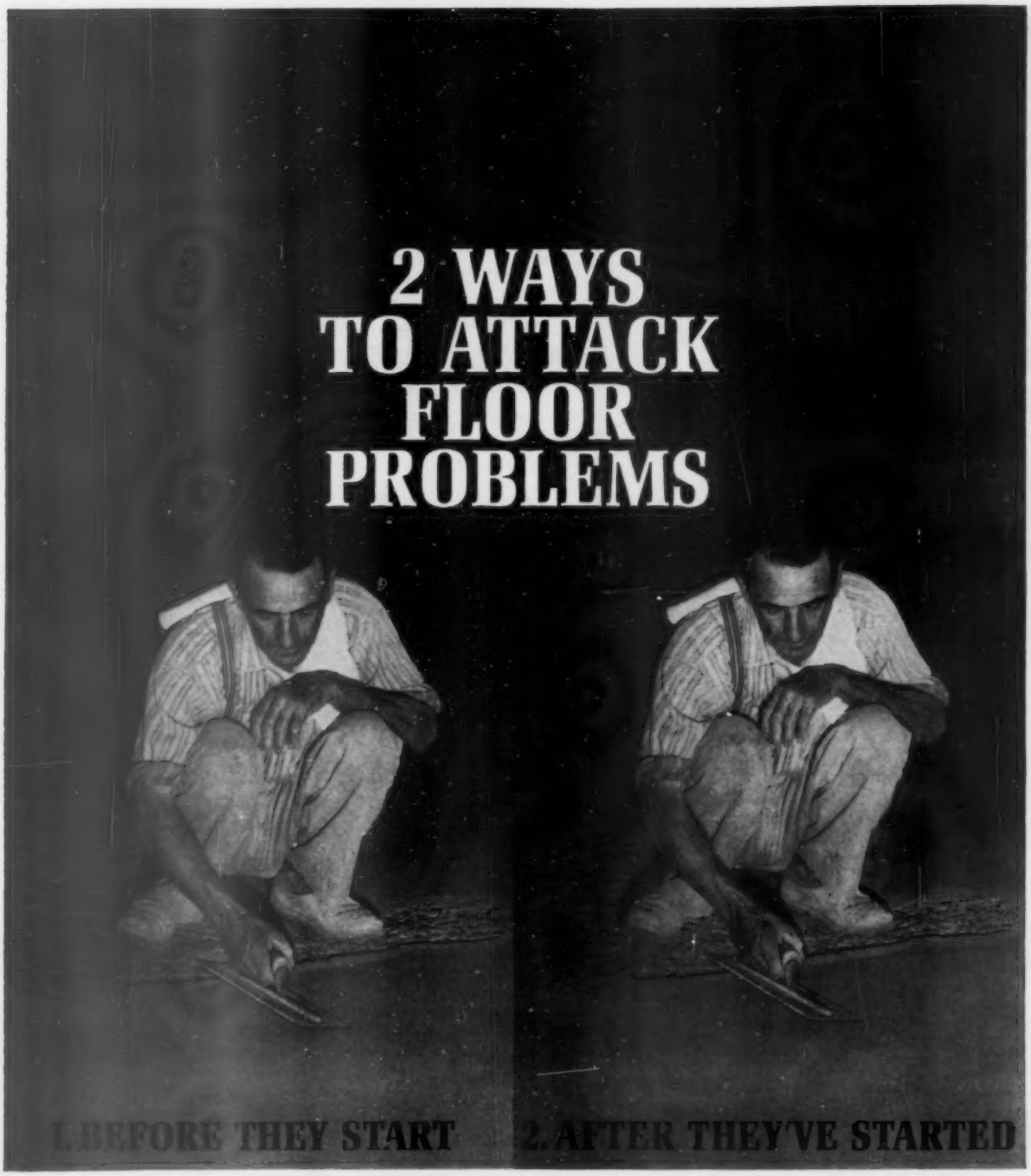
321—Speed reducers. Book 2751 on in-line helical-gear type with double, triple, quadruple reductions. Link-Belt Co.

322—Speed reducers. Book 2719 on parallel shaft types in 57 compact sizes with rugged housings. Link-Belt Co.

323—Speed reducers. Books 2618 and 2718 on shaft-mounted types—angular, horizontal, vertical. Link-Belt Co.

Turn the page

2 WAYS TO ATTACK FLOOR PROBLEMS



THIOKOL LIQUID POLYMER-BASE MORTARS with epoxies are meeting industry's most serious flooring problems.

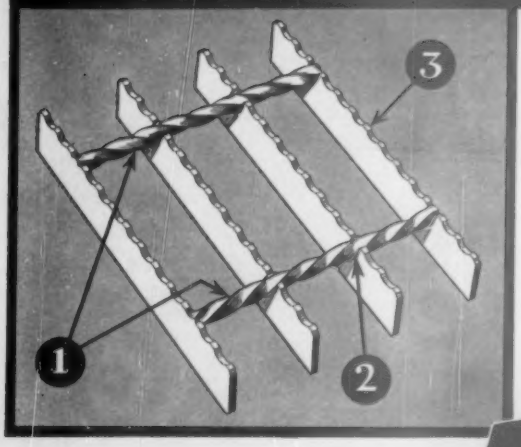
IN PLANTS GOING UP—where the manufacturing process is recognized as potentially destructive to conventional materials—liquid polymer-base mortars can be installed originally to avoid frequent, costly maintenance.

IN EXISTING PLANTS—faced heretofore with a continuing cycle of restoration—liquid polymer base mortars have been used for remedial application. These compounds have ended, once and for all, profit-robbing down time, hazards to personnel, unsightliness, and high maintenance outlays.

THIOKOL liquid polymer-base mortar stands up to heavy traffic, abrasion, chemical attack like no other flooring compound. It can be applied over existing surfaces regardless of their composition, and is ready for traffic in less than a day. For complete data, send for Brochure FC-100.

Thiokol®
CHEMICAL CORPORATION
780 N. Clinton Ave., Trenton 7, N. J.
In Canada: Naugatuck Chemicals Division, Dominion Rubber Company, Elmira, Ontario

EXTRA SAFETY FEATURES —in— KERRIGAN *Weldforged* GRATING



1. Spirals *alternate* in cross bars
2. Spirals are *continuous*, even at weld points.
3. Serrations available: Sharp, Medium or Coarse

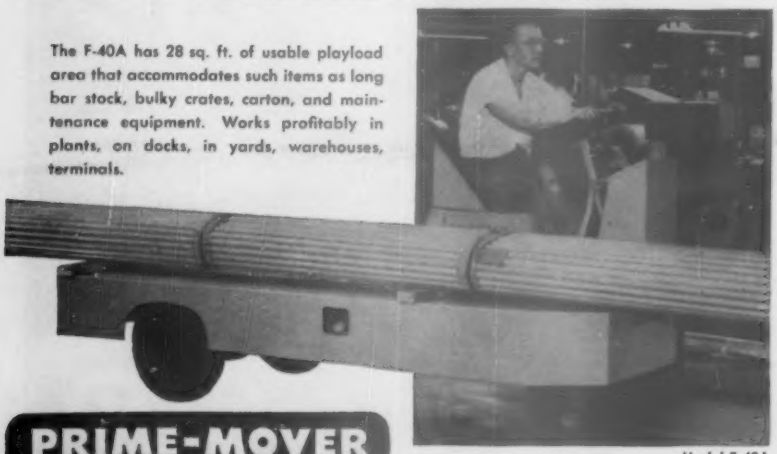
KERRIGAN IRON WORKS COMPANY
Nashville, Tennessee

Write now for new, easy-to-use catalog on this electronically weldforged steel grating with the EXTRA safety features.

ADDRESS: DEP'T. F-11

For more facts Circle 594 on Reader Service Card

The F-40A has 28 sq. ft. of usable playload area that accommodates such items as long bar stock, bulky crates, carton, and maintenance equipment. Works profitably in plants, on docks, in yards, warehouses, terminals.



PRIME-MOVER

Model F-40A

with torque-converter drive has durability and capacity

Built with hefty materials and tough components, this unit is designed from the ground up to carry 4000 lbs. under severe operating conditions. Automotive steering, torque converter drive, four wheel hydraulic brakes, large tires . . . all combine to provide operating convenience and easy handling. The Prime-Mover F-40A is a good investment in a large 28 sq. ft. payload area of dependable mobility for many indoor and outdoor handling-transporting jobs. The Prime-Mover Co., Muscatine, Iowa.

PRIME-MOVER PLATFORM TRUCKS ARE SOLD & SERVICED BY INDUSTRIAL TRUCK DISTRIBUTORS.

Begins on page 290

ADVERTISERS' LITERATURE

Offered in ads received up to 5th of last month for this issue. For items you want, use Reader Service Card.

324—Roller chain. Catalog 760 covers stock chain, sprockets, and couplings of all types. Diamond Chain Co., Inc.

325—Sheaves, sprockets. Bulletin on taper-lock mounted sheaves, sprockets, couplings, pulleys. Dodge Mfg. Corp.

326—V-drives, chain and sprockets, bearings. Data on selection, drive, and ratings. Dodge Mfg. Corp.

MATERIALS HANDLING

327—Mobile crane. Illustrated folder on versatile, highly maneuverable mobile crane. Vanguard Mfg. Co.

328—Dock boards. Bulletin DB-204 to help you spot and correct high-cost dock loading problems. Magline, Inc.

329—Gas lift trucks. Here's a brochure on Model GLF gas-powered lift trucks. Automatic Transportation Co.

330—Electric lift truck. Specifications on Model ERS battery-powered lift truck. Automatic Transportation Co.

331—Compact electric truck. Want data on Model RST? Capacities: 2000, 2500, 3000 lb. Automatic Transportation Co.

332—Narrow aisle truck. Specification sheet on Model VST—2000, 3000, 4000 lb. Automatic Transportation Co.

333—Tramrail cranes. Booklet No. 2008 contains full data on light tramrail cranes. Cleveland Tramrail Div.

334—Slotted angle. Idea book (24 pages), "Creative Framing at Lowest Cost," has many applications. Acme Steel Co.

335—Hoists. Catalog lists line of electric chain or wire rope, hand hoist, pullers. Chisholm-Moore Hoist Div.

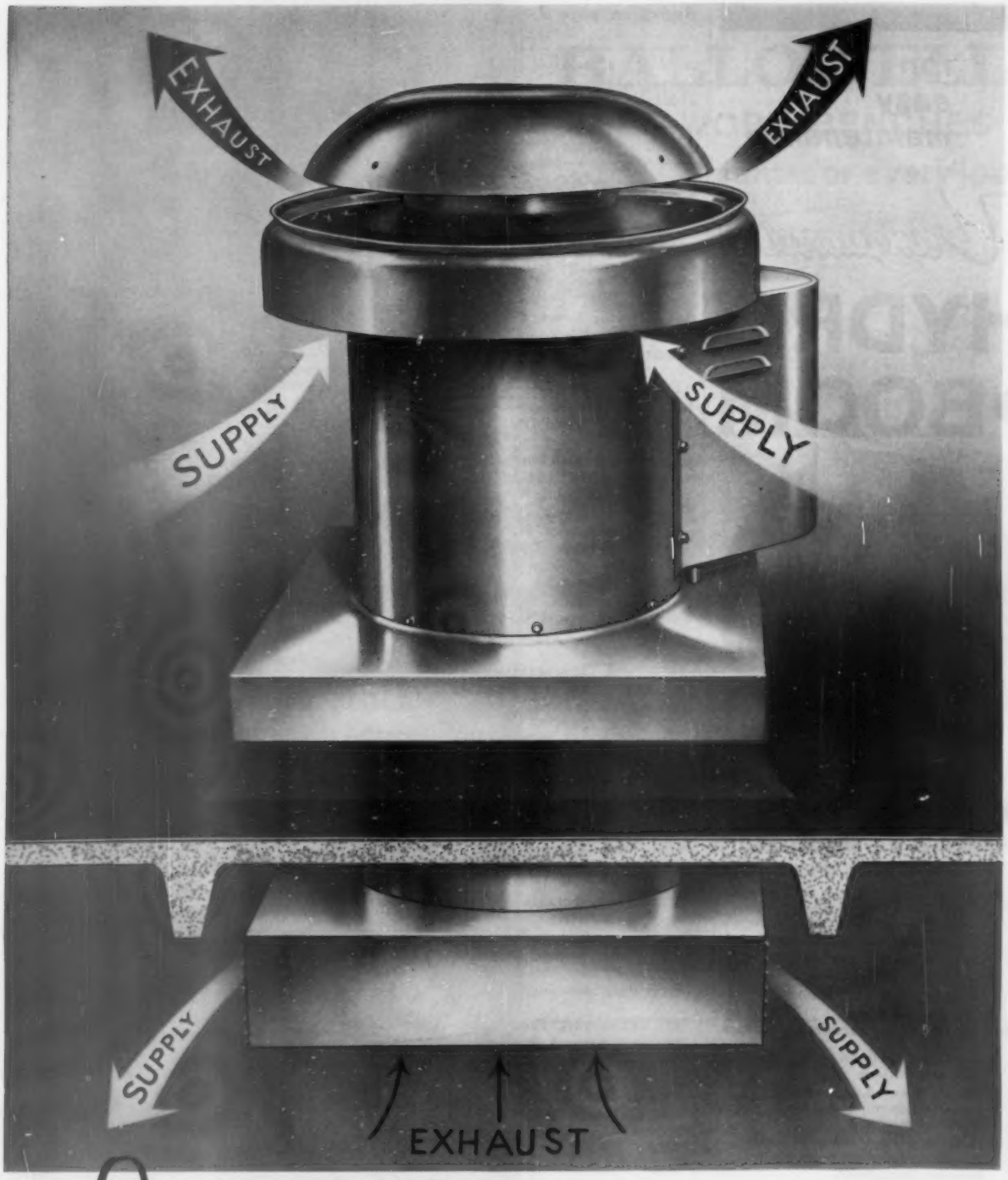
336—Levelling lifts. Information on hydraulic power lifts up to 400,000 lbs. Many uses. Dover Corp.

337—Remote control system. Bulletin 187 has data on industrial switching locomotives. Union Switch & Signal.

338—Monorail system. This 52-pager shows crane applications by industries. The Louden Machinery Co.

339—Wire rope slings. Handbook contains helpful data on selection and use. Union Wire Rope, Armco Steel Corp.

Turn the page



One impeller does it

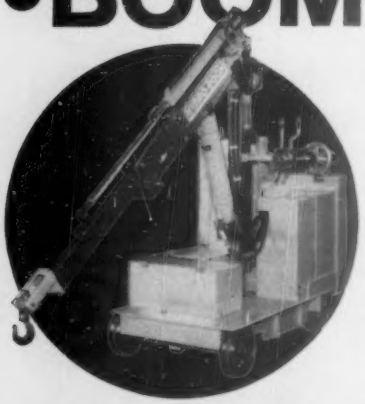
You get both air supply and exhaust simultaneously with the new Clarage TWINALATOR*. Unique, superior dual function air handling for all types of buildings. Definite money-saving advantages: Requires only one opening, one motor, one drive, one starter. No make-up air unit necessary. Applications unlimited — well adapted to closed or semi-closed systems. Can be provided with heating coils and filters. Write today for Bulletin 552. CLARAGE FAN COMPANY, Kalamazoo, Michigan. Clarage sales engineering offices are located in all principal cities.

*Patented Trademark

for easy maintenance

Vanguard

HYDRO •BOOM



PUTS THE LOAD WHERE YOU WANT IT

1/100th of an inch precision control in three different directions!

Vanguard's Hydro-Boom is today's most versatile mobile crane—accurate, highly maneuverable, ideal for any type operation. The boom moves up-down, in-out, right-left, positioning up to 3000 lbs. at full boom extension to within 1/100th of an inch. See its other fine features below and send for free literature.

- Boom extends to 48-in. beyond front end of truck.
- Battery-powered, hydraulically actuated boom lift, extension and retraction.
- Available hand or power propelled.
- Welded construction, anti-friction bearings throughout.
- Also hand-hydraulic operation for explosion hazard areas.

Write today for free illustrated folder

Vanguard

1908 E. 66th St., Cleveland 3, Ohio
HEnderson 2-0464

Begins on page 290

ADVERTISERS' LITERATURE

Offered in ads received up to 5th of last month for this issue. For items you want, use Reader Service Card.

340—Pallet loaders. Bulletin APL-60 on automatic and semi-automatic types, applications. Mathews Conveyer Co.

341—Tractor-shovel. Complete data on new H-30B Payloader. Gas or diesel engine. Frank G. Hough Co.

342—Wire rope. This booklet describes structural features, applications, etc. Roebling's Wire Rope Div.

343—Drop bottom boxes. Information on versatile material handling storage, shipping boxes. Republic Steel Corp.

344—Metal lumber. How to make racks, shelves, brackets, framework in exact sizes as needed. Republic Steel Corp.

345—Pallet racks. Here are details on space-saving, simplified stacking racks. Republic Steel Corp.

346—Lifts. This catalog describes 54 standard models of power, manually propelled lifts. Crown Controls Co.

347—Lift trucks. Bulletin BU-680 covers "F" series trucks. Capacities to 10,000 lbs. Allis-Chalmers.

348—Chain. Booklet 14-A deals with electrically flash-welded alloy sling chains. S. G. Taylor Chain Co.

349—Steel shelving. Here's a 100-page catalog with facts on patented clip, stud types. Lyon Metal Products, Inc.

350—Floor trucks. Details on line of aluminum floor trucks for various uses. Wear-Ever Aluminum, Inc.

351—Conveyors. Brochure describes engineered material handling flow system control. Rapids-Standard Co.

352—Hoist. Bulletin H-55 gives complete data on balanced-design heavy lift hoist. Harnischfeger Corp.

MAINTENANCE

353—Work platforms. Complete catalog on line of overhead lift-type work platforms. Economy Engineering Co.

354—Paint. Slide Guide, and 10-page-booklet "How To Reduce Painting Costs." Barreled Sunlight Paint Co.

355—Unions, fittings. Descriptive brochure on Dart unions and fittings is free on request. The Fairbanks Co.

Turn the page

With "Ship To" frame pre-printed by carton maker, shipping clerk uses Multistamp Duplicator to address up to 1000 pieces of the same shipment with the same low-cost stencil . . identically, accurately, quickly, easily.

Using Multistamp FORM-CUT stencil, printing the form and fill-in data at the same time is an easy, one-man, one-hand operation. Your form is custom die-cut in the stencils . . you fill them in with ball point pen or typewriter.

MULTISTAMP **Stencil Addressing System**

Quickest Way for **Volume Shipping**

EASY-TO-READ FADE PROOF **QUICK DRYING WATERPROOF**

Shipping department addressing errors are virtually eliminated when address and routing information are printed directly on cartons by the Multistamp Stencil Duplicator. The print becomes an identical smear-proof . . fade-proof . . water-proof . . permanent part of every carton. Following simplified Multistamp Marking Methods, the address stencil is cut in the same typing which fills out shipping order, bill of lading, invoice, and other forms. One typing . . one easy operation.

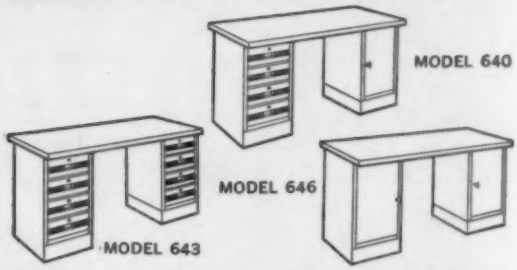
Write Today for your free copy of the illustrated new how-to-and-why book about the Multistamp Marking Methods.

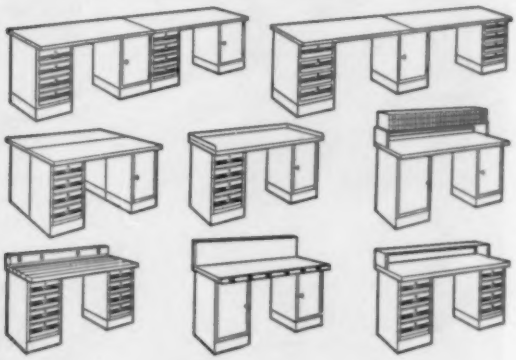
MULTISTAMP
STENCIL DUPLICATOR
THE MULTISTAMP CO. NORFOLK, VA.

HALLOWELL

UNIT WORK BENCHES

more efficient—for every job





HALLOWELL Unit Work Benches, with interchangeable accessories, allow you to rearrange or add units for changing work requirements. Work flows smoother . . . your shop stays neater . . . when you equip with rugged, long-life Hallowell Benches. Widest selection of sizes and accessories in the industry. Order from your local distributor's stock. No long wait for delivery. Mail coupon for complete catalog.

COLUMBIA-HALLOWELL Division SPS
Jenkintown 11 Pa.
Please send me the Hallowell Full Line Catalog.

NAME_____ TITLE_____
(Please Print)

FIRM_____

ADDRESS_____

CITY_____ ZONE_____ STATE_____

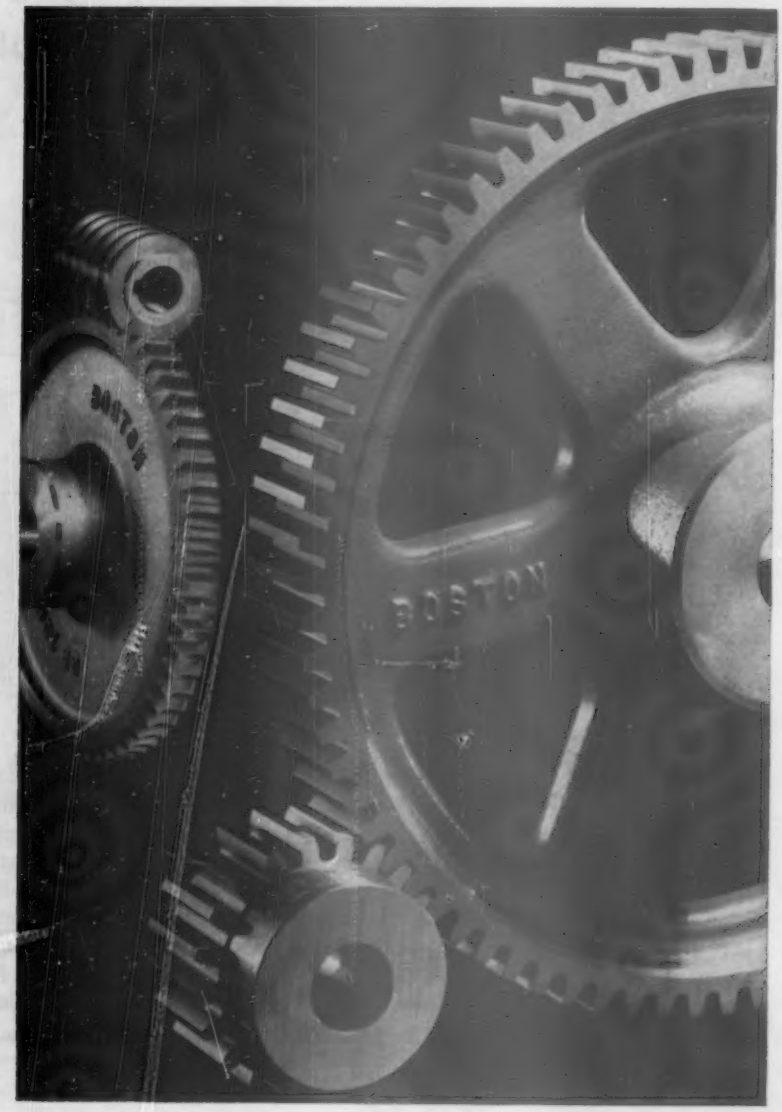
COLUMBIA-HALLOWELL Division **SPS** JENKINTOWN 11 PA. • SANTA ANA, CALIFORNIA

where reliability replaces probability

For more facts Circle 599 on Reader Service Card

BOSTON Gear® QUALITY

14½° stock gears 20°



Largest selection – off the shelf.

1781 types and sizes 14½° P.A. – 48 to 3 pitch.

782 types and sizes 20° P.A. – 120 to 4 pitch.

Spur, bevel, miter, worm, helical, spiral miter.

Brass, steel, iron, nonmetallic. See Catalog 57.

IN STOCK at your nearby DISTRIBUTOR

BOSTON Gear®

© Boston Gear Works, 1961
Quincy 71, Mass.

Begins on page 290

ADVERTISERS' LITERATURE

Offered in ads received up to 5th of last month for this issue. For items you want, use Reader Service Card.

356—Machinery mounts. Bulletin 60-04C, "Practical Considerations When Installing Machinery." Barry Controls.

357—Engineered maintenance. This 16-pager outlines benefits of programed maintenance. Puritan Chemical Co.

358—Flexible pipe joints. Booklet 805 on joints ⅜ to 4 in. O.D., lengths to 36 in. Marman Div., Aeroquip Corp.

359—Machinery mounts. Here's literature on new Level-Rite 500 Series. Withstands weights to 750 lbs. Unisorb.

360—Machinery mounts. This book on mounts—from laboratory equipment to giant presses—is free. Unisorb.

361—Ball valves. Circular 612 has complete data on new stainless-steel ball valves. The Lunkenheimer Co.

PACKAGING & SHIPPING

362—Shipping room supplies. "Handy Helper" is guide to better shipping methods. Diagraph-Bradley Industries.

363—Stencil duplicator. This new how-to (and why) book is free—gives many facts. The Multistamp Co.

PLANT SITE

364—Pennsylvania. Brochure "Plant Location Services" has other data and facts. Pennsylvania Dept. of Commerce.

365—Nebraska. Facilities Register lists suppliers, sub-contractors in Northern Plains. Northern Natural Gas Co.

366—Colorado. Here's a portfolio of nine booklets on "Industrial Colorado." Colorado Dept. of Development.

367—Toledo, Ohio. All about plant location facilities in Toledo-Northwestern Ohio area. Toledo Edison Co.

368—Kentucky. Full details, recommendations on financing, locating plants, other data. Commonwealth of Kentucky.

Plant specifications . . .

. . . describe 20 top plants of 1960 and 1961. 35¢ per set. Order from Reader Service Dept., FACTORY, 330 West 42nd St., New York 36, N.Y.

FOR LEASE:

(A materials handling system that cuts costs in six basic areas)

Example: The SEALDBIN container above has a volume of 300 cubic feet. It has produced these results: (1) Cost of disposable containers was eliminated; (2) Loading and unloading is effected in just one hoist, compared to many hours of bag handling; (3) One man fills or empties the SEALDBIN in 10 or 15 minutes; (4) Material loss through broken bags, moisture, contamination and pilferage was eliminated; (5) Transportation costs were lowered because SEALDBINS can be shipped on open flatcars, decks or trucks; (6) Warehousing costs were eliminated because SEALDBINS are their own protection and may be stored outdoors.

The entire U.S. SEALDBULK SYSTEM may be leased, which means no capital investment. Explore the U.S. SEALDBULK SYSTEM further. Write for Bulletin CP-59-41.

U.S. Sealdbins now being used for Polypropylene, Polyethylene, Soda Ash, Caustic Flake, Ammonium Nitrate, Aluminum Chloride, and many other dry, flowable materials.

United States Rubber

Inflatable Products and Transportation Containers Dept.
10 Eagle Street, Providence, R. I.

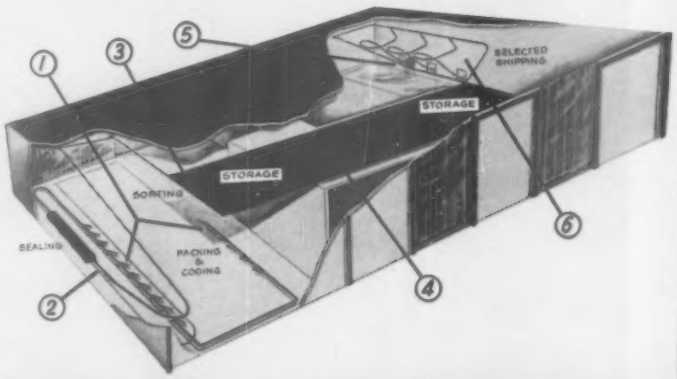
For more facts Circle 601 on Reader Service Card

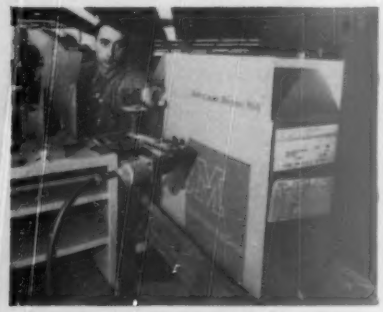
REPORT ON

CUTTING COSTS WITH CONVEYORS

How a Standard Conveyor custom-engineered system at IBM provides · simple electronic sorting · space-saving gravity storage · push-button order filling · one-man operation

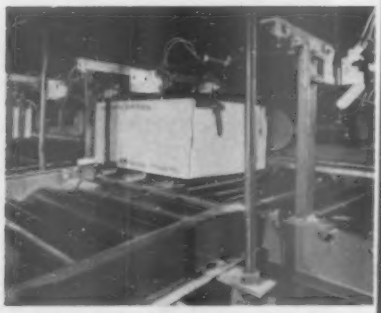
IBM's punched card plant at Concord, Mass. turns out hundreds of millions of cards per year for its New England customers. The mere physical handling of this massive volume is a problem in itself—and it becomes even trickier because each order is unique, usable only by one customer. Complicating the problem, each carton of 10,000 cards is outwardly identical, except for the shipping label. Here's how Standard Conveyor's *System Specialists* helped IBM work out a simple mechanized system to solve the intricate sorting and storing problem.



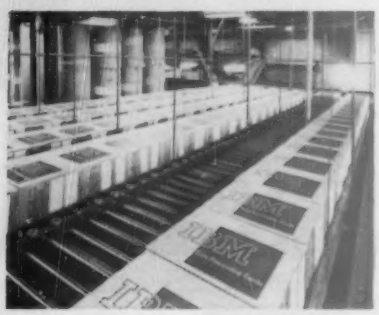


1 At card manufacturing machine station, each full carton is automatically coded by a brass staple as it enters conveyor system. Staple position determines to which storage line carton will go. Staple does not penetrate inside of carton.

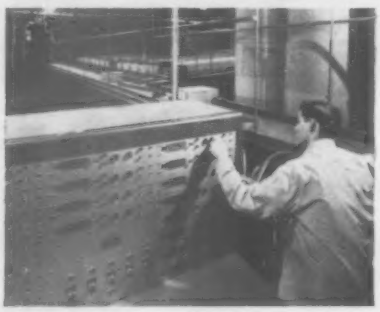
2 Boxes from various stations, representing different customer orders, are intermixed on main conveyor line. After being closed and sealed they are turned on their sides before being routed to sorting and storage conveyors.



3 On sorting conveyor, position of coding staple, now on top, is sensed by electrical brass-fingered reader. If reader contacts staple, a retractable stop pops up and air actuated ram pushes carton into correct storage line.



4 Six of the 16 ceiling-hung storage lines as seen from the sorting area. Each customer order is now in one line and may consist of any number of cartons.



5 Shipping clerk at order filling console knows from his shipping card where orders are stored, how many cartons each order contains, and which carrier gets which order. When truck arrives, clerk selects order desired—rest is automatic.

6 Cartons enter shipping room from storage lines at left. Shipping clerk also operates electrical diverters from console to route each order into one of four chutes. Thus, one man controls the entire sorting and storing system.

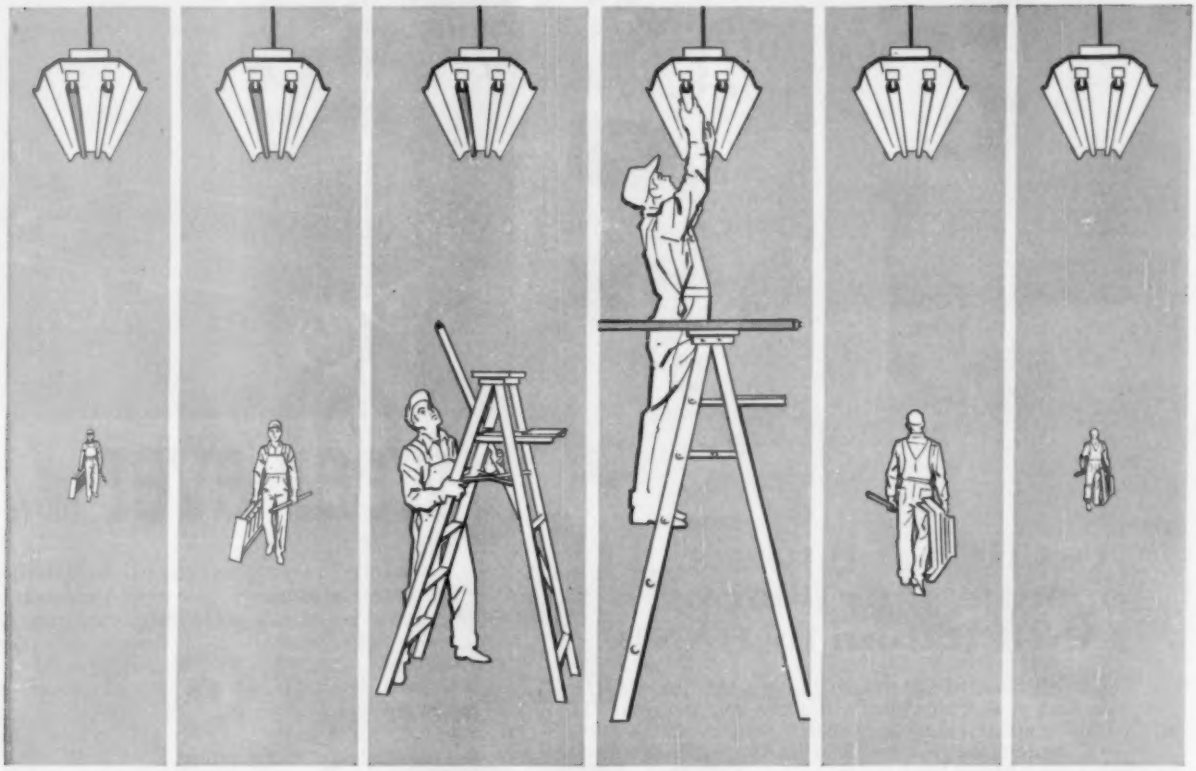
Standard Conveyor COMPANY

304-L Second St., North St. Paul 9, Minn.

Specialists in the System Concept of Conveying. Fully staffed with professional personnel who are ready to help you envisage, engineer and execute a master plan to cut material handling costs. Sales engineering offices in more than 50 cities . . . consult your telephone book Yellow Pages under "Conveyors".

For more facts Circle 602 on Reader Service Card

How long does it take him to replace one lamp?



TWENTY MINUTES! That's the average time it takes to replace one lamp. First the phone call for maintenance, then the requisition, lamp, ladder, hike to the site, lamp replacement, the walk back, disposal of old lamp, put ladder away. And work interruptions among other employees, caused by one-at-a-time lamp replacements are an expensive item not included.

This General Electric Plan can save you 26 hours labor on every 100 lamps you use!

It takes a man about 33 hours to replace 100 lamps if he does it one-at-a-time . . . and less than 7 hours if he does it with this modern General Electric Plan for group relamping. That's a cut-and-dried savings of 26 hours for every 100 lamps you use. Twenty six times the hourly cost of your maintenance man!

But there's more! With this plan you also get up to 25% more light, 75% fewer work interruptions, 75% fewer buying and stocking headaches . . . and a better looking lighting system.

Records prove this simple plan works best with General Electric Lamps. Why? Because they have a more uniform lamp life. They last most customers well over 2 years . . . with fewer early burnouts. What's more, the plan has a built-in reminder that eliminates record-keeping—tells you when it's time to begin another cycle. *Right now* is the best time for you to suggest this money-saving system to *your* company.

Send coupon for full information on General Electric's simplified Group Relamping Plan. It's free, no obligation. When you get it, see for yourself just how much you can save—in good hard cash for your company.

Progress Is Our Most Important Product

GENERAL ELECTRIC

MAIL THIS COUPON TODAY!

General Electric Co., Large Lamp Dept. C-022
Nela Park, Cleveland 12, Ohio

I want to cut my lighting maintenance costs to the bone! Send me more information on General Electric's Group Relamping Plan right away!

NAME_____

COMPANY_____

ADDRESS_____

CITY_____ ZONE____ STATE_____

it's not only easier...

it's CHEAPER to operate your door by FINGER than by HAND

That big door of yours cost quite a bit but, it isn't the first cost that counts, it's the *cost per year*. If you can stretch that door investment over 10—20—30% more time, you're just that much ahead. And, it's easy—here's how:

INSTALL A POWER OPERATOR WITH REMOTE CONTROLS. Hand operation bangs and racks the daylights out of any door and takes years off its life. We know, because we repair such doors every day and much of this cost is avoidable. PUSH-BUTTON OPERATION cushions the ups and downs of even the biggest door, so gently, that (if it's a good door to start with, and barring accidents) it should last the life of the building.

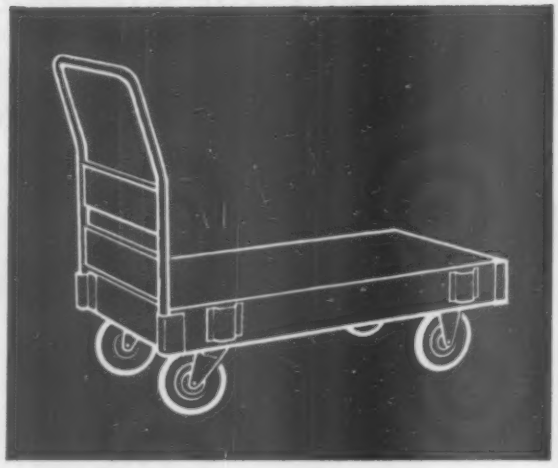
THOSE HANDY BUTTONS do a lot of other things, too—save workmen's time running back and forth to open and close the door and standing around waiting for trucks to go out and in; make it easy to keep the door closed; save heat in winter and keep the people who are closest to the door a lot happier. And, over the years, those benefits add up to a real good deal.

Crawford Mainline Operators are available for any type and size door and you can have nearly a dozen different control arrangements. Your local Crawford dealer sells, installs, guarantees and services, stocks parts and even provides emergency service nights, Sundays, holidays. (Classified Pages under DOORS and DOOR OPERATORS.) Call him or write us. Crawford Door Co., 20263-12 Hoover Road, Detroit 5, Michigan.

Crawford

INDUSTRIAL DOORS and DOOR OPERATORS

Quality and Service for over 30 Years



Let wear-ever move it

Even the women in your plant can handle lightweight Wear-Ever aluminum trucks. This newest addition goes like lightning, yet stands up to long, hard use. One-eighth-inch thick, heavy-duty aluminum base. Eight-inch diameter rubber-tired casters roll smoothly over uneven floors. Special panels (two sides, one end) turn 47" x 23" flat bed truck into a panel truck. Send reply card for full details on this and other Wear-Ever trucks; or write Wear-Ever Aluminum, Inc., New Kensington, Pa. Immediate delivery.

For more facts Circle 605 on Reader Service Card

IT'S ALL NEW AND READY FOR YOU

it's your NEW HANDY HELPER Shipping Room Supply Catalog

THIS HANDSOME "NEW" EDITION IS YOUR MODERN GUIDE TO BETTER SHIPPING METHODS AND SHIPPING ROOM SUPPLIES, INCLUDING THE ORIGINAL "ROL-IT-ON" ROLLER STENCIL PROCESS.

Clip this handy coupon or write on your letterhead

DIAGRAPH-BRADLEY INDUSTRIES, Inc. D·B.

P. O. BOX 269 HERRIN, ILLINOIS

Please Send Me a FREE COPY of "Your Handy Helper"

Name ..... Title .....

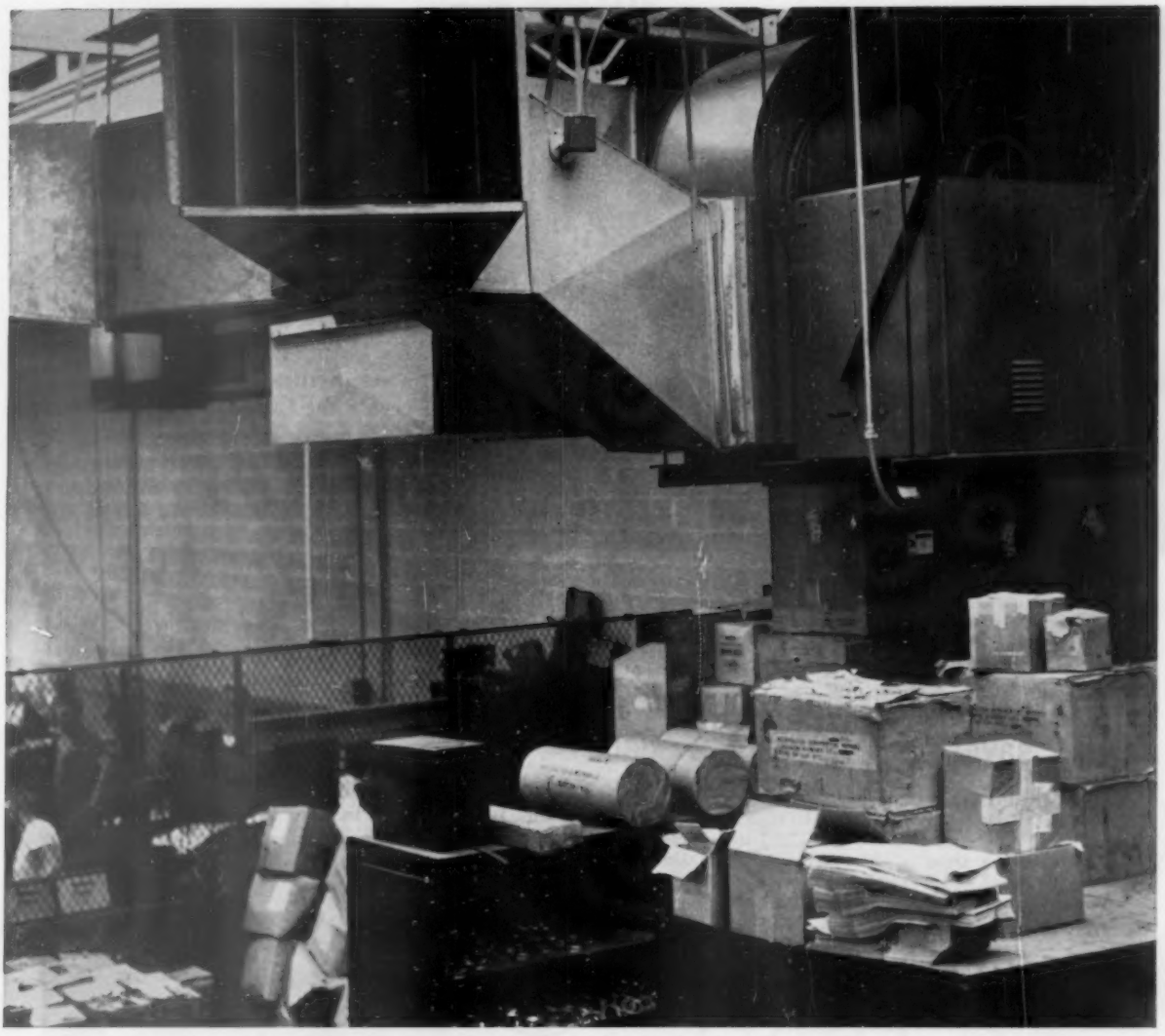
Firm .....

Address .....

City ..... State .....

 For more facts Circle 604 on Reader Service Card

For more facts Circle 606 on Reader Service Card



This gas-fired make-up air heater, equipped with Maxon burners, replaces exhausted air in the plant of Kiekhaefer Corporation, makers of "Mercury" outboard motors.

Cure plant air starvation with make-up air heated by GAS-fired MAXON burners

Many plants become starved for air when their exhaust systems remove air faster than it is replaced. This was the problem at Kiekhaefer Corporation of Oshkosh, Wisconsin, before they installed a gas-fired make-up air heater, equipped with Maxon AIRFLO Line Burners.

The entire plant had been under negative pressure, created by suction of exhausters at many grinding operations. This pulled downdrafts in unit heater vent flues. Workers complained of watery eyes and headaches. Condensation dripped on material. Heat loss was excessive. Maintenance cost on unit heaters became prohibitive.

Replacement air, heated by gas-fired Maxon Burners, solved all these problems at minimum cost. In fact, initial cost of this make-up air heater was quickly amortized on reduced maintenance and savings on fuel costs. The plant enjoys all the advantages of modern gas heat: high efficiency, precise control, speed, cleanliness, economy and dependability.

For information on heating make-up air with gas-fired Maxon burners, call your local Gas Company. Or write to Maxon Premix Burner Company, Incorporated, Muncie, Indiana.

American Gas Association

Designed expressly for make-up air heating, the Maxon AIRFLO Line Burner and Mixer provide complete, odor-free combustion over very wide ranges of turn-down. They are standard equipment in many packaged heaters, and are highly recommended for heating the replacement air for paint spray booths in finishing lines.

FOR HEATING MAKE-UP AIR GAS IS GOOD BUSINESS!

Powell FLOW-MATIC system discharges box contents automatically, via gravity feed, at proper work level. Lift truck has easy access to load and unload boxes.

POWELL FLOW-MATIC®

trims handling time 30%, saves 20% in storage space

Federal-Mogul Division improved its bulk handling of small parts with a low-cost Powell FLOW-MATIC materials handling system. Its Cleveland Plant gained more than 20% in limited floor space, saved 30% in handling time . . . while producing 60-80 million bushings, spacer tubes and washers yearly.

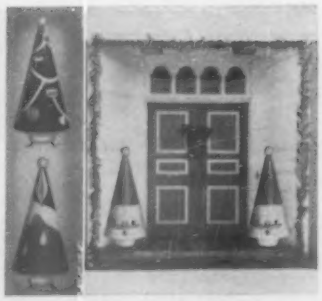
Simplify your production, handling and storage with the Powell FLOW-MATIC system. Write for *Bulletin FM* today.

THE POWELL PRESSED STEEL COMPANY

DEPARTMENT 101-11 • HUBBARD, OHIO

Materials handling is our only business

Powell FLOW-MATIC systems reduce handling time as much as 48%.



Outdoor Christmas Decorations

Deck your lawn or doorway with a set of these special displays to create the Christmas spirit. Rigid full-round 36″ high molded plastic shapes, assembled with 100 watt lamp in base. Optional decorated faces (specify): Santa, Tree or Candle. Shipped freight collect. $15.00 each. Send for color brochure. Complete catalog 'Christmas 1961' also available, depicting 60 units (in color) illustrating our complete line of Illuminated Plastic Outdoor Christmas Decorations. General Plastics Corp. — 1403 N. Washington St., Marion, Indiana.

Circle 609 on Reader Service Card

SOURCES OF SUPPLY

Suppliers and sub-contractors in the Northern Plains can be pinpointed quickly by the Facilities Register, a unique electronic index of production facilities. Whether yours is a problem of finding new suppliers, contracting for idle machine time, shortening lines of supply, or obtaining better quality and service:

ASK THE MAN FROM THE NORTHERN PLAINS

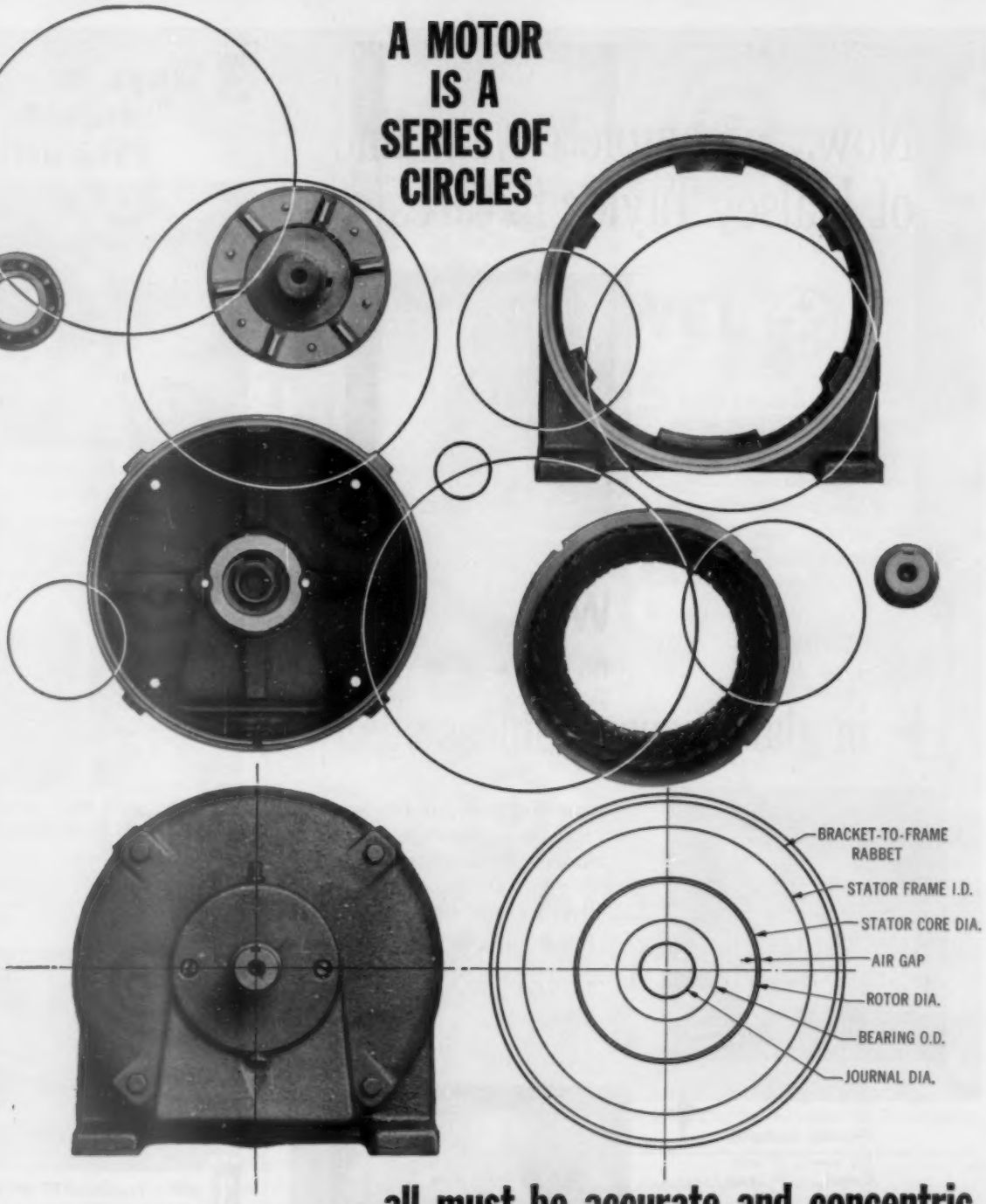
NORTHERN NATURAL GAS COMPANY

SERVING THE NORTHERN PLAINS ☐ GENERAL OFFICES: OMAHA, NEBRASKA

For more facts Circle 608 on Reader Service Card

Circle 610 on Reader Service Card

A MOTOR IS A SERIES OF CIRCLES



all must be accurate and concentric

In manufacturing Elliott Crocker-Wheeler motors, a dozen critical "circles" are formed accurately and concentrically through unique and extraordinarily precise production methods. The result is exact alignment of all parts, true and uniform air gap, free-spinning rotor, quiet, cool, dependable operation.

■ *Elliott Crocker-Wheeler integral-hp a-c and d-c motors—from smallest to largest—are offered in all conventional enclosures and modifications; with insulation to suit the application, including* EPOSEAL *epoxy insulation for use where conditions are most severe.*

WI-9

ELLIOTT COMPANY

GENERAL OFFICES: JEANNETTE, PENNSYLVANIA

PLANTS AT: Jeannette and Ridgway, Pa.; Springfield, Ohio

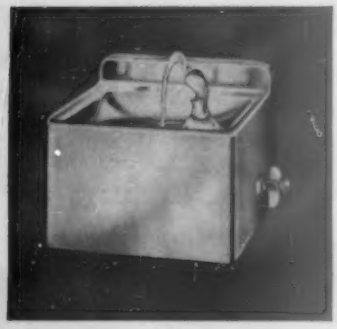
TURBINES · GENERATORS · MOTORS · COMPRESSORS · TURBOCHARGERS · EJECTORS · STRAINERS · TUBE CLEANERS

Now...a complete NEW line of Halsey Taylor fixtures ✦

You are looking at the very newest in face-mounted wall fountains... exciting new designs dramatically created in stainless steel by Halsey Taylor. They're just some of the many fountains and coolers in the complete new Halsey Taylor line!

The Halsey W. Taylor Co.
Warren, Ohio

✦ in glamorous stainless steel



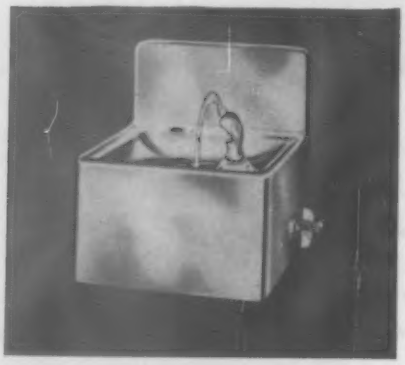
In addition to these, you can obtain recess and semi-recess wall types, coolers for all purposes, class-room fixtures and wall brackets...all in lustrous stainless steel.

And you also get all the extra Halsey Taylor features, such as dependable performance, health-safety, maintenance-free service.

Fountains Illustrated:

Top View...13" back
Centre.....1¾" back
At right.....6" back

Write for latest catalog, or see Sweet's or the Yellow Pages



Halsey Taylor®

THIS MARK OF LEADERSHIP IDENTIFIES THE MOST COMPLETE LINE OF MODERN DRINKING FIXTURES

461

3 Ways to Increase Production

1 PROVIDE PARTS CLEANING SOLVENT CANS AT THE MACHINE

Keep machinists doing productive work—eliminate unnecessary trips to centrally located parts cleaning station. Machine Bench Can attaches to machine or bench. Depressing fire safe Dasher dips parts; releasing pressure returns parts for draining. 10" x 7" x 8" deep; Capacity 2 gallons.

2 CLEAN SMALL PARTS AT WORK STATION IN AIR OPERATED MACHINES

Clean small machine parts in flammable solvents safely and automatically with Protectoseal Protectomatic Parts Washers. Require no attention from operator during wash cycle. Parts in basket are moved through solution to provide effective cleaning action. Operate on 35 psi. Cap. 6 gal; 30 lb. basket load; 15" x 15" x 25½" deep.

3 APPLY FLAMMABLES WITH AUTO MATIC PLUNGER CANS

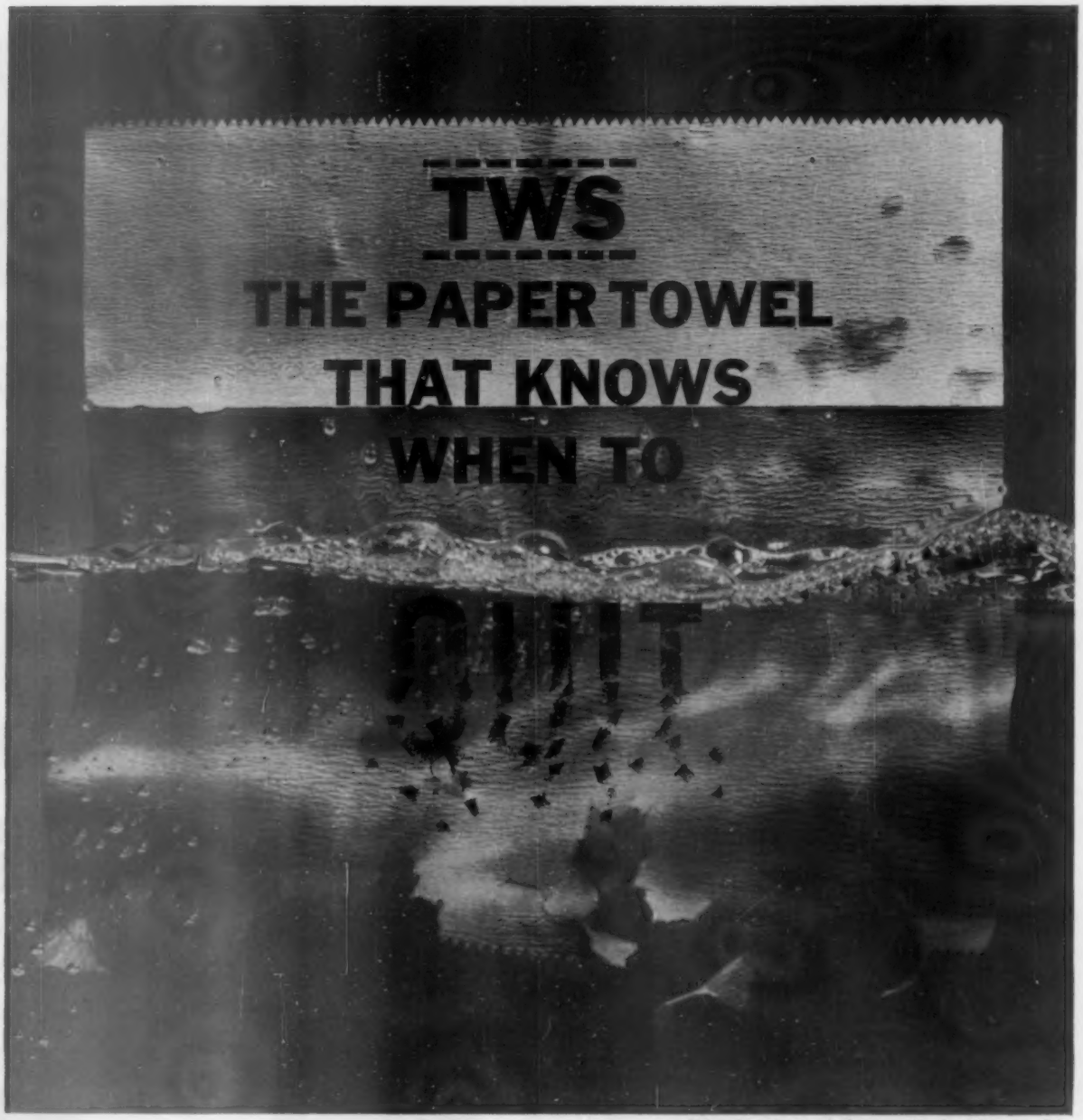
Use automatic, fire safe Protectoseal Applicating Cans for assembly or cleaning operations requiring use of flammable solvents. Depressing dasher pumps a measured quantity of solvent into dasher cup to dampen swab, brush, or sponge. Saves time, solvent, reduces toxic or explosive vapor hazard. Made in 7 sizes; capacities to 2 gallons of solution.

Write for Protectoseal Catalog of fire-safe products for handling, dispensing, and use of flammable liquids in production operations.

THE PROTECTOSEAL COMPANY
1952 S. Western Ave. • Chicago 8, Illinois

For more facts Circle 612 on Reader Service Card

Circle 613 on Reader Service Card



(Dissolves in turbulent water in 55 seconds)

Send for your Free Sample of this new TWS Nibroc Towel — specially designed and developed to end plumbing problems due to the accidental disposal of paper towels. Unique *Timed Wet Strength* — dissolves the towel after use!

You've got to see it to believe it — TWS Nibroc towels do their wiping job with strength . . . yet disintegrate quickly after immersion!

TWS Nibroc towels were made to order for this job — and only for this job. It's another example of Nibroc's complete line — a line designed for better service.

Fill out the coupon — test TWS Nibroc towels — see what a difference *Timed Wet Strength* makes!

F-11

Another Quality Product of

BROWN COMPANY

BERLIN, NEW HAMPSHIRE
General Sales Offices:
150 Causeway Street, Boston 14, Mass.

☐ I'm interested! Send free samples to:

Name.....

Title.....

Street.....

City.....*Zone*....*State*.....

Four to choose from
in high-voltage power cable

You can match precisely the conditions your high-voltage power cable is exposed to when you specify Rome.

The reason is simple: Rome offers both oil-base and butyl-base insulation as well as a choice in jacketing.

Four of the more popular combinations are: (1) Rozone inside . . . Roseal outside, (2) Rozone A inside . . . Roseal outside, (3) Rozone inside . . . Roprene outside, (4) Rozone A inside . . . Roprene outside.

With *Rozone* you have a premium oil-base insulation with high resistance to corona, ozone and water, as well as high dielectric and impulse strength. *Rozone A* (butyl-base) has excellent ozone resistance and also protects against extremes in temperature.

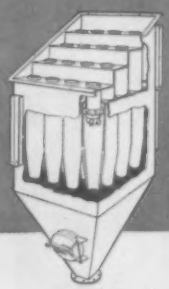
In jacketing, *Roseal*, a thermoplastic compound, provides excellent mechanical and weather protection. It also resists abrasion, heat, flame, moisture, oils and most chemicals. It is recommended as a nonmetallic sheath over shielded and unshielded power cable and can be used underground or overhead.

Roprene, a thermosetting compound, provides added heat resistance plus adequate resistance to most environments. Unlike fibrous coverings, it does not need to be cut back at terminals and splices. So it completely protects exposed ends on unshielded cables. Like Roseal, this compound can be used overhead or underground.

Need high-voltage cable now? Rome offers "off-the-shelf" delivery for many types. Get all the facts from your area sales office. Or write to Rome Cable Division of Alcoa, Dept. 21-111, Rome, N. Y.

ALCOA
ROME CABLE
DIVISION

 For more facts Circle 615 on Reader Service Card



Traps MORE dust at LESS cost
MULTICLONE
mechanical dust collector

If **cyclonic collection** will clear your dust problem—a **Multiclone** by Western Precipitation will do it best.

HIGH EFFICIENCY. Multiple **small**-diameter collectors—a WP-pioneered feature—generate greater centrifugal forces for higher separating efficiency.

MORE ECONOMY — all along the line. Basic cost, installation, housing, maintenance **all** are less. No costly, complicated ducting. Highly adaptable units can often be fitted into existing structures. No moving parts—and cast iron tubes and vanes **last.**

MORE INFORMATION? For literature, write Western Precipitation, 1000 West 9th Street, Los Angeles 54, California. (In Canada write 8285 Mountain Sights Avenue, Montreal, P.Q.)

Dust and fume control since 1907

WESTERN PRECIPITATION
DIVISION OF JOY MANUFACTURING COMPANY

For more facts Circle 616 on Reader Service Card

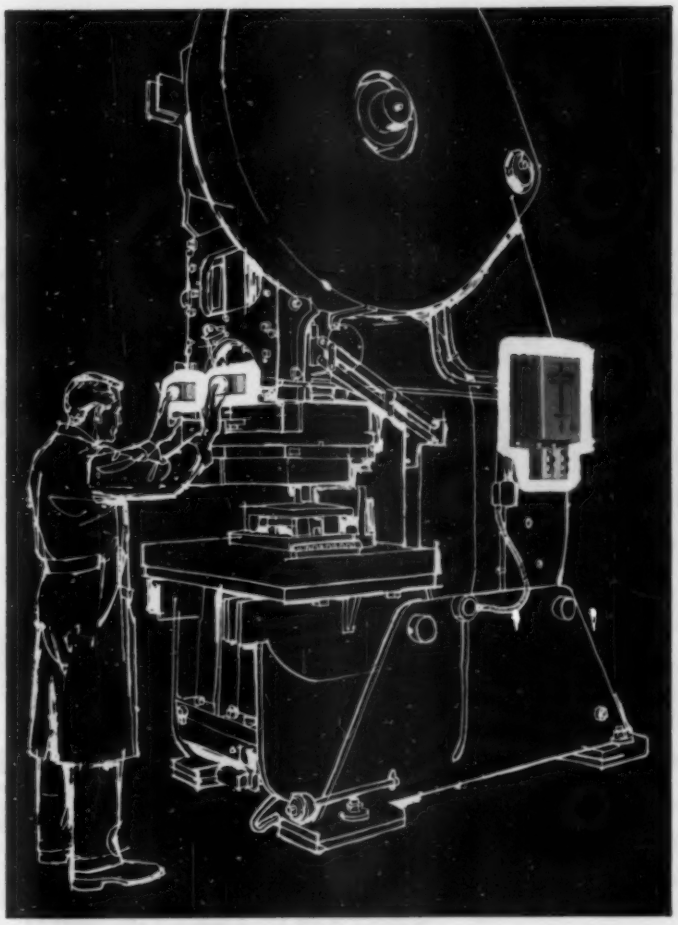
INDUSTRY FINDS COLORADO
RICH!

Companies "prospecting for plant sites" . . . find rich new benefits in Colorado. Pleasant Living, a product of Colorado's magic climate attracts and holds the most competent personnel. Industry's westward migration has made Colorado the transportation hub serving the vast new markets west of the Mississippi. "Site-see" Colorado now . . . *right at your desk.*

SEND FOR FREE EXECUTIVE PORTFOLIO "INDUSTRIAL COLORADO." . . . A newly completed 9-booklet portfolio on Colorado's industrial sites, assets, opportunities and weekend vacation wonderland. *All inquiries held confidential.*

COLORADO
DEPARTMENT OF DEVELOPMENT
62 State Capitol Denver 2, Colorado

For more facts Circle 617 on Reader Service Card



DO YOUR PUNCH PRESSES REALLY MEET THE SAFETY CODES?

It's a shock to find that virtually all conventional machine controls fail to truly meet the non-tie-down specifications. Most are designed so that when a stroke is interrupted, it can later proceed unexpectedly. And, that's the stroke that can maim or kill!

Recently an accident occurred on a friction clutch press which a conscientious management had fully equipped with 2-hand controls and the so-called one-stroke or anti-repeat feature. After the costly loss the company began asking itself how the accident happened on a machine they thought was completely safe. They carefully reenacted the sequence and found that the operator had interrupted the stroke by taking his right hand off its control and then attempted to straighten the material in the danger zone. In doing so he inadvertently touched the control with his shoulder and because he still had his left hand on the other control the machine completed the stroke, seriously maiming his hand.

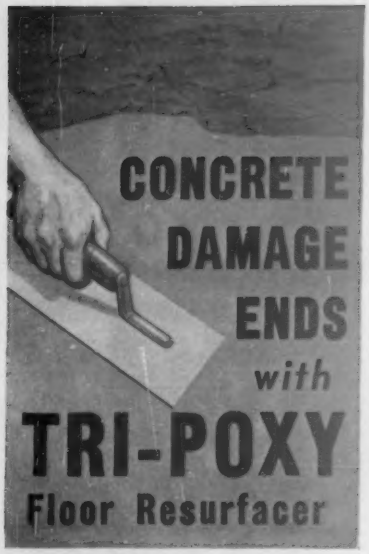
They found an answer . . .

The company found the answer in a MICRO SWITCH Trip Control unit that was quickly and easily mounted on the machines. An exclusive "can't cheat" feature prevented the dangerous possibility of the operator tying down or wedging one switch and operating the control with one hand. Resumption of the stroke, as in the accident situation, could not occur without the operator taking both hands off the controls and then intentionally touching both simultaneously (or *all* control switches on machines with more than one operator). A unique "fail-safe" feature prevented accidental actuation of the clutch that might have been caused by any faulty or damaged component in the system.

On new installations . . . production increases!

When MICRO SWITCH Trip Controls are installed to electrically modernize machines, production increases because operators experience less fatigue actuating the low-force electric switches and a fast work rhythm soon becomes natural due to the smooth, two-hand operation. Instant electric clutch actuation also eliminates "lag" between operator action and machine action.

MICRO SWITCH Trip Controls are approved and/or recommended by many states including: New York, Pennsylvania, California and Wisconsin. Packaged kits are available to fit virtually all hand-operated machines and the units start as low as $60.00. See your MICRO SWITCH Distributor listed in the Yellow Pages or write for Catalog 65. MICRO SWITCH . . . Freeport, Illinois, a division of Honeywell. In Canada: Honeywell Controls, Limited, Toronto 17, Ontario.



TOUGH!
4 times stronger, 2-6 times more abrasion-resistant than heavy duty concrete. Denser than any known chemical-resistant floor surfacing material.

DO-IT-YOURSELF!
Regular personnel simply mix and apply ¼" covering. No special tools or equipment needed, no re-levelling installations.

VERSATILE!
Trowels rough or smooth depending on requirements. Takes light to medium traffic in 10-15 hours, heaviest traffic in 72.

Mail this coupon today!

MYCO

MASURY-YOUNG COMPANY
Dept. J-11
76 Roland Street, Boston 29, Mass.
Offices in Principal Cities

☐ Call to explain test based on unconditional money-back guarantee.

☐ Further information.

Name_____ Telephone_____

Company_____

Address_____

City_____ Zone____ State_____

 Circle 619 on Reader Service Card

- *Latest mechanical features*
- *Newest techniques in manufacture*
- *Most advanced high strength materials*

PRIME-MOVER PALLET TRUCK

Prime-Mover Pallet Trucks represent the latest engineering design—most efficient production techniques—strongest modern materials. Fewer and stronger parts mean longer, trouble-free, dependable service and performance.

The sealed hydraulic system is precision machined with ground finishes to maintain positive, leak-proof operations. All wear points are cast and machined rather than formed or stamped. Up-dated and made to traditional PRIME-MOVER high standards.

MODEL P-25
$359

MADE IN TWO SIZES:
2500 lb. capacity, Model P-25
4500 lb. capacity, Model P-45

Available in 20½ and 27 inch widths; in 36, 42, 48 inch fork lifts. Model P-25 costs only $359; Model P-45 costs only $395.

Manufactured in Muscatine, Iowa by the PRIME-MOVER CO. and sold by leading material handling equipment dealers throughout the country.

PRIME-MOVER

For more facts Circle 620 on Reader Service Card

CUT COSTS with MAGNETIC CONTROL

The fastest and easiest scheduling board-CONTROLS machine loading, production, maintenance, personnel, sales, dispatching, organization charts, projects, and others. Steel board holds permanent various colored magnets, magnetic card holders for colored cards, arrows and other colorful accessories. MAGNETS MOVE FASTEST OF ALL. Let us place our eight years of experience in this field at your service.

Write for Free Brochure (F-11)

METHODS RESEARCH CORP.
105P WILLOW AVE., STATEN ISLAND 5, N. Y.

Circle 621 on Reader Service Card

Streamline your plant operation with this trouble-free, simplified, highly sensitive scale. The slightest discrepancy of over-weight or under-weight is instantly revealed by DETECTO'S over-under indicator. Write for information on full line of industrial weighing equipment from 1/100 oz. to 100 ton: **DETECTO SCALES, INC.**
Dept. F-1, 540 Lark Ave., Brooklyn 5, N. Y.

Circle 622 on Reader Service Card

In the palm of your hand
one machine... 79 cost-cutting uses!

THE TORNADO 400 SERIES VACUUM is the *one* big-power maintenance tool that never wastes a minute . . . applies itself to 79 basic jobs. Whether it's vacuuming dirt or metal chips, cleaning a boiler, performing wet pick-up of any solution or working as a portable cleaner, blower or sprayer, the TORNADO 400 works with speed and efficiency. From super-speed air intake and filtering to removable, self contained motor, here is quality that *purrs*, quality that pays substantial on-the-job dividends. A small investment for the *big* job it does—let us prove it!

Converts in seconds to any job!

FREE 20-PAGE HANDBOOK... NEW IDEAS ON REDUCING MAINTENANCE COSTS

A "must" for all maintenance men.

BREUER ELECTRIC MFG. CO.
5128 Ravenswood Avenue, Chicago, Ill.

Yes, I want your free handbook on the Tornado "400" and "79 Cost Cutting Uses!"

Name _____

Company _____

Address _____

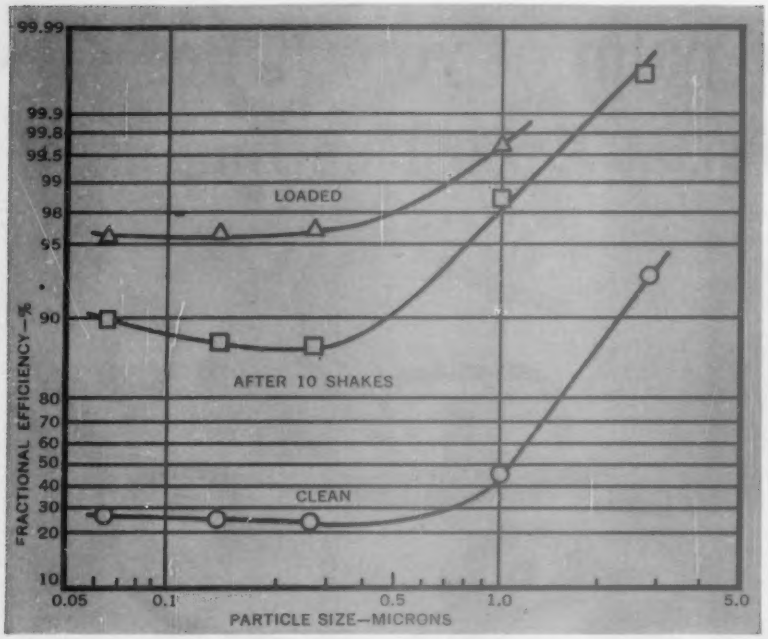
City _____ Zone ____ State ____

TORNADO®

Ask about the
NEW TROT-MOP
AUTOMATIC SQUEEGEE VACUUM ATTACHMENT

Cleans large floor areas in big, fast swipes. Request Bulletin 1029

For more facts Circle 623 on Reader Service Card



revolutionary "dust-making machine" proves Torit Dust Collectors have

HIGH FILTERING EFFICIENCY

Because of an increase in critical dust collection problems and rising standards in industrial hygiene, need has arisen for more precise measurements of filtering efficiency. In the past, because of inability to produce uniform-size, sub-micron dust particles, filtering efficiency has been measured by weight. However, recently a homogeneous aerosol generator capable of producing uniform sub-micron particles as fine as .05 microns (1/500,000 inch) and as coarse as 15.0 microns, has been developed by Dr. K. T. Whitby, leading authority on particle technology. (Smoke, fumes, and bacteria fall within this range; most industrial dusts are 2 microns or larger.) Tests using such uniform particles indicate fractional efficiency based on particle count . . . the most exacting filter efficiency tests ever devised.

Under this most demanding of all filter tests, Torit Cloth Filter Dust Collectors performed superbly. Fractional efficiency when loaded with fine dust ranged from 96% at 0.1 micron to 99.99% at 2.5 microns; and after shaking 10 times, from 88% at 0.1 microns to 99.93% at 2.5 microns.

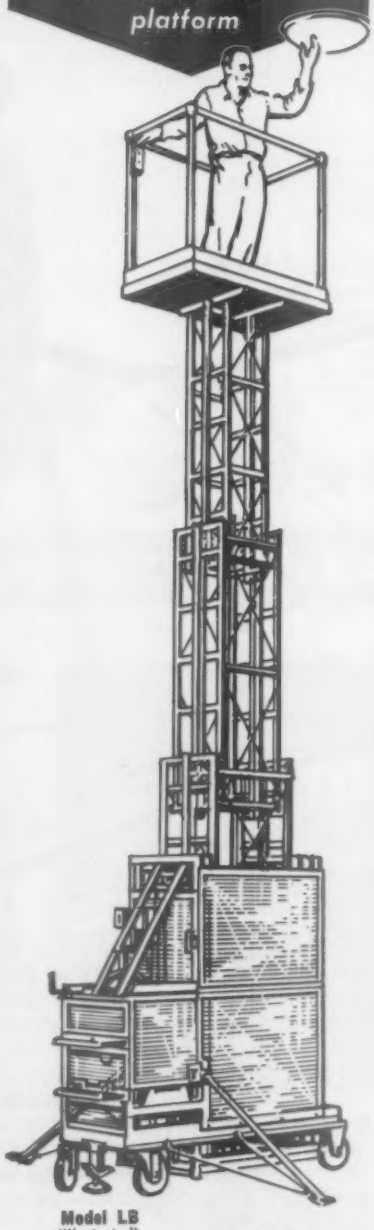
For further information, write for Dr. K. T. Whitby's Technical Report on the "Fractional Efficiency Characteristics of a Torit Unit Type Cloth Collector."

TORIT manufacturing company

1133 Rankin Street, St. Paul 16, Minnesota, Dept. 336

For more facts Circle 624 on Reader Service Card

Complete Safety
with a
HI-REACH TELESCOPER
Fast work with all tools and materials on the platform



Model LB
(illustrated)
Hi-Reach Telescoper
Lifts 20 ft. to 40 ft.
$1510.00 up

Model PUL
Lift 10'9"—$370.00
Lift 15'0"—$400.00

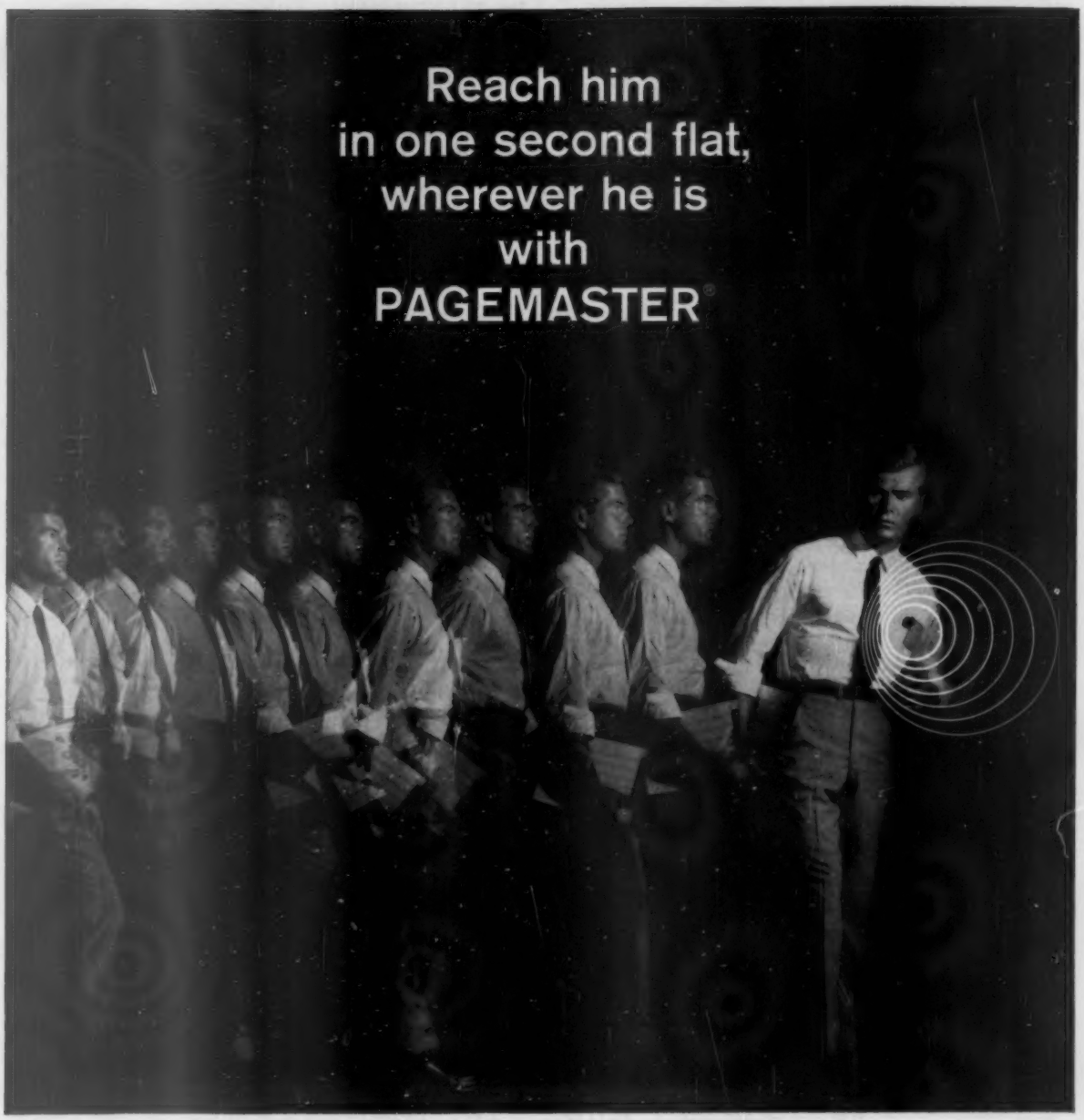
Custom built Hi-Reach Telescopers up to 100 ft.
Write for complete catalogue

Headquarters for standard and special built overhead servicing lifters and material handling equipment since 1901.

ECONOMY ENGINEERING

4527 West Lake Street, Chicago 24, Illinois

Circle 625 on Reader Service Card



Find him instantly—in the stockroom, at the other end of the factory, even out of doors—way beyond the range of conventional paging systems.

Alert him—and only him. His—and only his—pocket-sized PAGEMASTER will beep discreetly. And will sound, again and again until he checks in. For PAGEMASTER is gentle but insistent.

What equipment do you need for a PAGEMASTER Selective Wireless Paging System? Nothing more than a desk-top encoder, a transmitter, an antenna, and transistorized, feather-weight receivers. Installation is immediate and inexpensive—no costly lights, loops or speakers are needed, no expensive drawn-out structural modifications are involved. And you can add receivers—up to several hundred—as your paging applications increase.

Want to see how much faster and how much more economically PAGEMASTER reaches key people . . . to help them get things done? Your STROMBERG-CARLSON® Communications Consultant has the irrefutable facts. For his name, call Western Union Operator 25, or write:

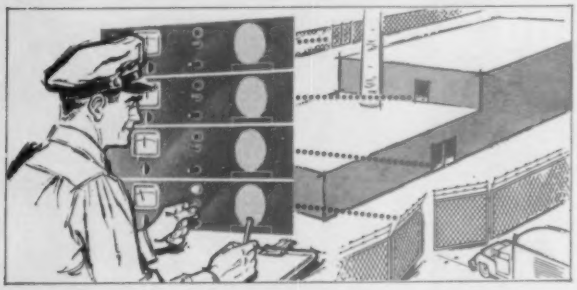
Commercial Products Division – Box F
1411 North Goodman Street
Rochester 1, New York

GENERAL DYNAMICS | ELECTRONICS

In modern business communications...THERE IS NOTHING FINER THAN A STROMBERG-CARLSON®

CUT PLANT PROTECTION OVERHEAD!

Now just one man, two wires, and Honeywell controls can tend your doors and gates



Stationed at a control panel, one centrally-located man or your telephone operator can control traffic at any door or gate safeguarded by Honeywell.

Located up to four miles away, *one man* . . .

- can determine the position of any door or gate and open or close it automatically.
- can determine the presence of anyone, at any time, and permit admittance of employees, authorized visitors and deliveries.
- can talk to anyone at a controlled entrance over a two-way communications system.

If positive, visual identification is required, closed-circuit TV can be added later.

Honeywell's door and gate control costs as little as $600. Many plants report that the system pays for itself in less than one year! For more detailed information on how you can save with Honeywell's door and gate control, call your nearest Honeywell office. Or send the coupon below. *Sales and service offices in all principal cities of the world.*

Honeywell

H HONEYWELL *First in Control* SINCE 1885

Door and gate controls are just one of Honeywell's practical and proven security and equipment monitoring systems. Others: central control panels, electronic fences, local annunciators, power supplies and systems for sonic motion and fire detection.

MINNEAPOLIS-HONEYWELL
Dept. FM-9-163, Minneapolis 8, Minnesota

Please rush information on your low-cost door and gate control.

NAME_____

COMPANY_____

ADDRESS_____

CITY_____ STATE_____

For more facts Circle 627 on Reader Service Card

ROUGH FLOORS? **MAGIC FLOOR** *repairs* **INDUSTRIAL FLOORS** *in minutes!*

SO EASY TO USE—Even Your Secretary Could Apply It!

Why halt traffic for floor repairs in your busy plant? **Ranco MAGIC FLOOR** is ready-to-use and needs no drying time. Just compress with ordinary lift truck—no laborious tamping or troweling. Traffic can roll **immediately** over the fresh floor patch.

MAGIC FLOOR is now available in a highly versatile, fine grading which can be applied thick or thin to excellent feather edges. Ideal for EXPANSION JOINTS broken to a V-shape. No skilled labor needed.

FREE SAMPLE: Send for a 2-gallon sample of MAGIC FLOOR, freight prepaid, no charge or obligation. Simply request on your company letterhead.

Write: RANCO INDUSTRIAL PRODUCTS CORP.
13311 M Union Avenue Cleveland 20, Ohio

For more facts Circle 628 on Reader Service Card

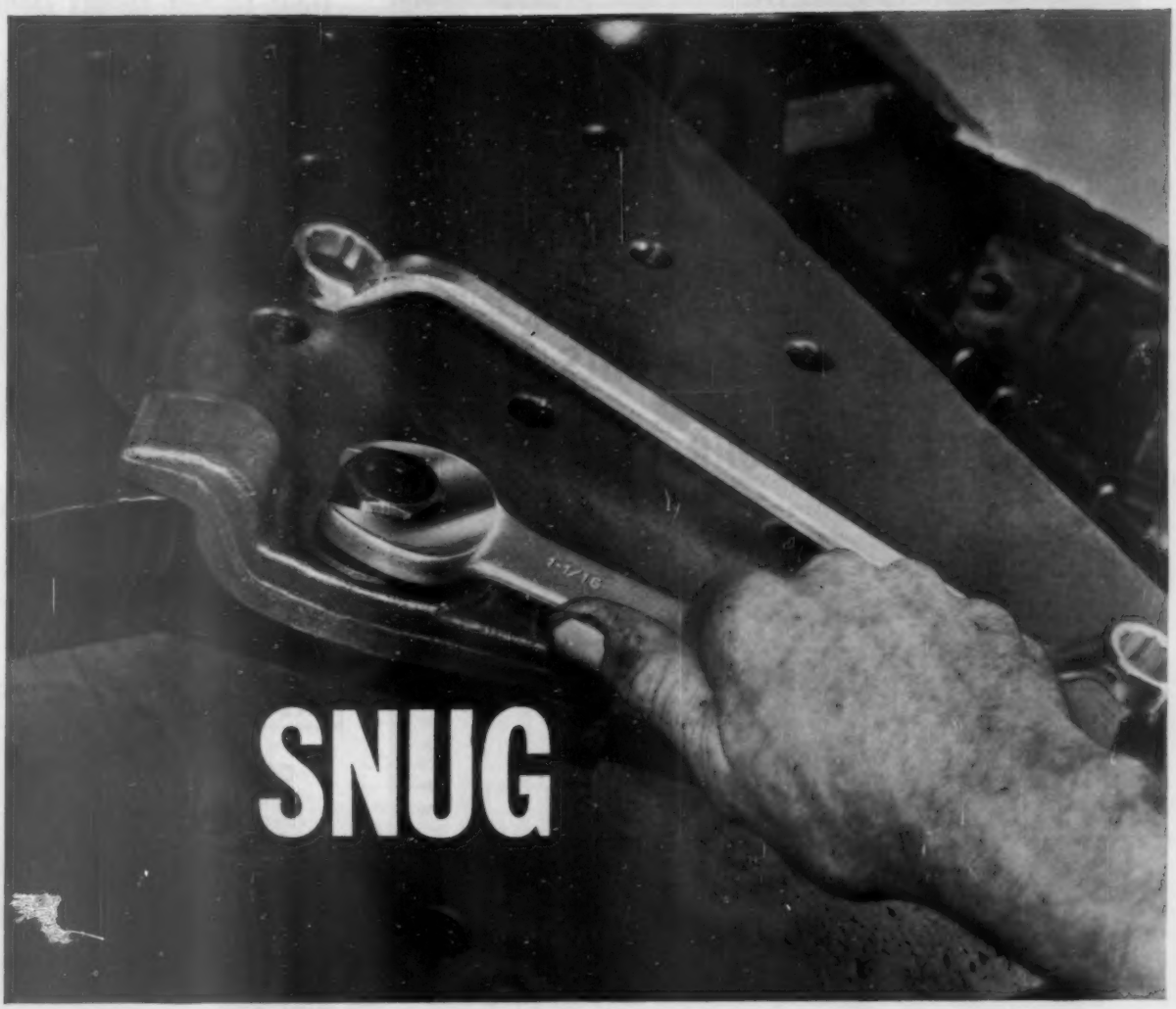
IF
YOU
CHANGE
YOUR
ADDRESS

please be sure to let us know promptly. It takes time to correct the stencil addressing plate. And we don't want you to miss copies of FACTORY.

EASY, quick way to tell us . . . use the Reader Service Card opposite the back cover. Be sure to give us both your *old* address and your *new* address, including your postal zone number. Drop the card in the mail and we'll make the change as quickly as possible.

FACTORY

330 West 42nd Street, New York 36, N. Y.



SNUG . . . that's how CRESCENT wrenches fit! A CRESCENT is the kind of wrench that grips a nut and hangs on by itself, turns the nut with a sure firmness, slips off clean for the next bite. The openings are accurately machined to fit. There's no wobble or slack.

CRESCENT open end and box wrenches are tough! They're drop-forged from special alloy steel and electronically hardened for lasting strength. They're built to take the punishment of long, hard use on heavy jobs. Yet careful engineering and precision machining make them slimmer and lighter than ordinary wrenches. They're easier to handle and balance better.

You'll find a CRESCENT Double Head Open End, Double Offset Box, or a combination of both, to fit every job . . . *snugly*. They're available individually or in convenient tool roll sets.

Next time you buy hand tools, buy the best . . . buy CRESCENT.

Sign of the Artisan Symbol of Excellence

CRESCENT TOOLS
Give Wings to Work®

Crescent is our trade-mark, registered in the United States and abroad, for wrenches and other tools. Sold by leading distributors and retailers everywhere and made only by

CRESCENT TOOL COMPANY, JAMESTOWN, NEW YORK

For more facts Circle 629 on Reader Service Card

Electrowriter® System expedites assignments for General Telephone of Florida

Electrowriter instruments play an important role in prompt, accurate customer service for the General Telephone Company of Florida at St. Petersburg.

The dispatcher writes authorizations for new and changed telephone numbers directly on the Electrowriter Transmitter; these authorizations are instantaneously recorded in writing by the Central Office's Electrowriter Receiver, four miles away, where wiring and switch racks are located.

Results? Assignments handled quicker, in writing, requiring only one person's time. Substantial saving in manhours are achieved. Busy frame men are no longer interrupted to receive assignments, for the Electrowriter Receiver takes written messages unattended. And permanent, written records streamline record-keeping.

NOW..."Write By Telephone"

You can "Write By Telephone" over regular dial networks* or private lines for alternate written message and voice service. Find out how your company can increase its efficiency and cut costs with Electrowriter Communication Systems. Send for full information.

*Electrowriter instruments are accepted for use over local and long distance facilities of the Bell System, General Telephone System, and independent telephone companies.

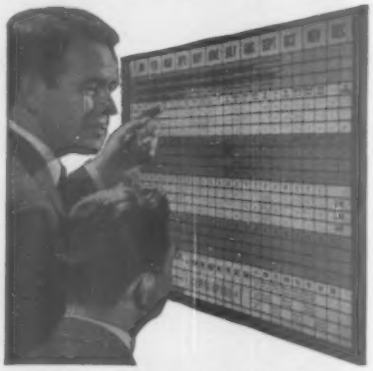
Electrowriter
COMMUNICATION SYSTEMS BY
COMPTOMETER

® ELECTROWRITER TRADEMARK REGISTERED U. S. PATENT OFFICE

Comptometer Corporation, 5600 Jarvis Avenue, Chicago 48, Ill. • SPring 5-2400 • Offices in Principal Cities.

316 For more facts Circle 630 on Reader Service Card

How To Get Things Done Better And Faster



BOARDMASTER VISUAL CONTROL

- ☆ Gives Graphic Picture—Saves Time, Saves Money, Prevents Errors
- ☆ Simple to operate—Type or Write on Cards, Snap in Grooves
- ☆ Ideal for Production, Traffic, Inventory Scheduling, Sales, Etc.
- ☆ Made of Metal. Compact and Attractive. Over 500,000 in Use

Full price $49.50 with cards

FREE 24-PAGE BOOKLET NO. X-100 Without Obligation

Write for Your Copy Today

GRAPHIC SYSTEMS

Yanceyville, North Carolina

Circle 631 on Reader Service Card

MAGNETIC *scheduling*

Rol-a-chart combines write-on/wipe-off entries on a rolling sleeve with . . .

MAGNETS
that MOVE with time

Schedule orders, deliveries, production, machine loading, maintenance, data processing, sales, with

Rol-a-chart
MAGNETIC
Visual Control Boards

FREE Scheduling Guide
and sample chart section

Write to ROL-A-CHART
P. O. Box 291 • Mill Valley, California

Circle 632 on Reader Service Card

FOOD FOR THOUGHT

NOW! New food service versatility from Canteen®

CounterVend: the unique combination of a cafeteria COUNTER and automatic VENDING machines to meet the need for fast, low-cost, in-plant food service

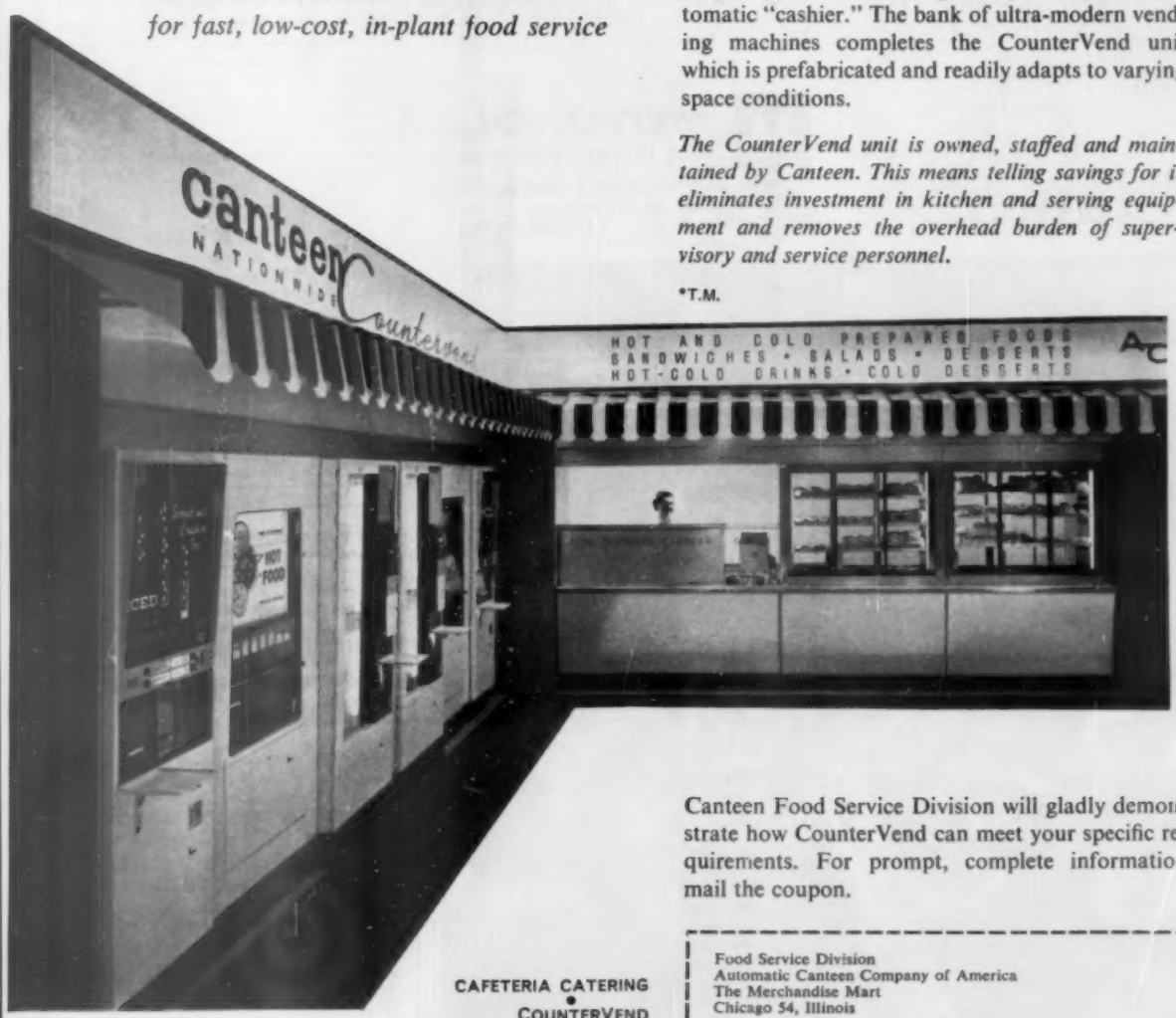
This spectacular new development from Automatic Canteen solves management's two most vexing in-plant food service problems: keeping employee satisfaction high, yet reducing costs sharply.

CounterVend,* as the name implies, offers the *personal* attention of counter service with the *speed* and *selectivity* of automatic vending. The variety of menus is pleasingly wide. Included are expertly prepared hot and cold food, pastries, desserts and beverages, as well as cigarettes, candy and gum.

The cafeteria section consists of an efficient food preparation area; refrigerated and heated, self-service cabinets and storage compartments; an automatic "cashier." The bank of ultra-modern vending machines completes the CounterVend unit which is prefabricated and readily adapts to varying space conditions.

The CounterVend unit is owned, staffed and maintained by Canteen. This means telling savings for it eliminates investment in kitchen and serving equipment and removes the overhead burden of supervisory and service personnel.

*T.M.



Canteen Food Service Division will gladly demonstrate how CounterVend can meet your specific requirements. For prompt, complete information mail the coupon.

Food Service Division
Automatic Canteen Company of America
The Merchandise Mart
Chicago 54, Illinois

Gentlemen:
We are interested in knowing more about Canteen CounterVend.

Name_____ Title_____

Company_____

Address_____

City_____ Zone_____ State_____

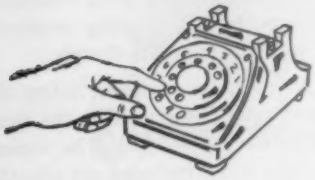
CAFETERIA CATERING
•
COUNTERVEND
•
VENDED FOOD SERVICE

AUTOMATIC CANTEEN

AUTOMATIC CANTEEN COMPANY OF AMERICA

For more facts Circle 633 on Reader Service Card

Find your man in 9 seconds...



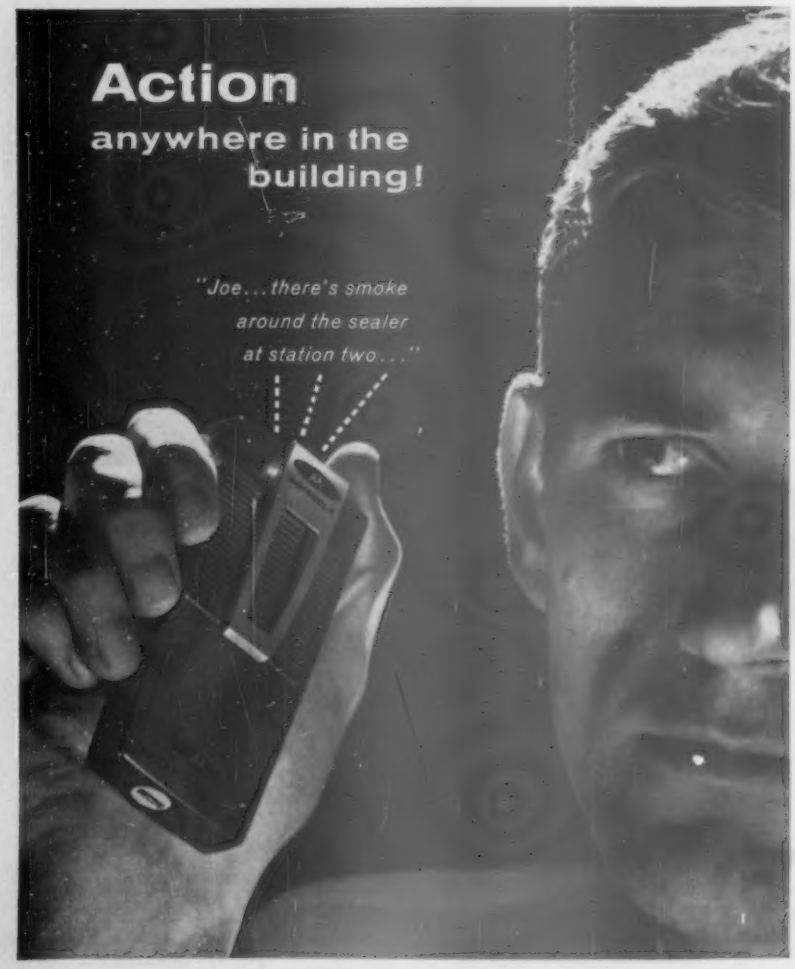
dial...

talk...

■ Your man is "somewhere in the building" and you need him fast. How much time do you waste before you can talk to him? Multiply your needs by others who must reach ■ maintenance man...a production supervisor ...an engineer...any of the vital men-on-the-go who keep your operations humming.

Now, in just 9 seconds you can "pinpoint" your man anywhere—in a noisy location or a quiet one—talk to him privately. With Motorola Radio Paging, problems are taken care of *almost as soon as they arise!* Ask for on-the-job proof...of performance in and around the building or city-wide ...of savings which often return entire system cost in a few months. Contact Motorola today. Write Dept. AFT 144.

MOTOROLA
RADIO PAGER
Motorola Communications & Electronics, Inc.
A Subsidiary of Motorola, Inc.
4501 Augusta Blvd. • Chicago 51, Illinois



McGraw-Hill Book News

WORK-FACTOR TIME STANDARDS

Just Out. Shows you how to increase business and industry productivity through the WORK-FACTOR System. Gives you tested techniques and values for measuring the time required for physical and mental work of every description . . . in advance of actual production. **By J. H. Quick, The National Co., J. H. Duncan, WORK-FACTOR Co., & J. S. Malcolm, Jr., WORK-FACTOR Co. 432 pp., $9.00**

AUTOMATIC CONTROL of HEATING and AIR CONDITIONING

Just Out—2nd Edition. Explains fundamentals of automatic controls . . . how they are selected and applied in the heating and air conditioning fields. Pneumatic, electric and electronic devices, and control circuits are thoroughly covered, and you see how to apply them to all types of heating and air conditioning. **By J. Haines, Minneapolis-Honeywell Reg. Co., 410 pp., 357 illus., $10.50**

THE CHALLENGE OF SUPERVISION

Just Out. Gives valuable guidance to supervisors in today's business world . . . shows you how to make the most of your supervisory capacity . . . shows you how to increase your personal job satisfaction by developing your ability to handle men. **By Brian R. Kay and Stuart Palmer, both of the University of New Hampshire. 325 pp., $6.95**

SUCCESSFUL COMMUNICATION IN SCIENCE AND INDUSTRY

Writing, Reading and Speaking

Just Out. Here's a practical guide on how to master the techniques of clear writing, persuasive speaking, and fast, accurate reading. In addition to tested practices and basic principles, this lively book gives you practical problems, examples, and original exercises. **By R. L. Zetler, Univ. of South Florida, and W. G. Crouch, Univ. of Pittsburgh. 290 pp., $7.95**

FLUORESCENT LIGHTING MANUAL

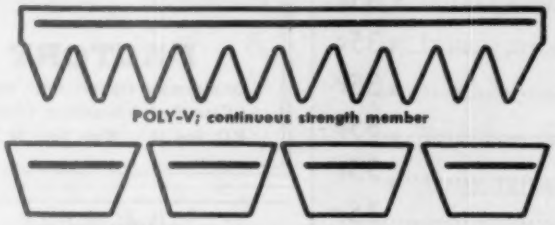
Just Out—3rd Edition. You'll find a wealth of information on design, construction, and performance characteristics of fluorescent lamps. The book tells you how to calculate illuminating requirements . . . design luminaries . . . and maintain all parts of a fluorescent system. **By Charles L. Amic, Day-Brite Lighting, Inc. 393 pp., 232 illus., 66 tables, $12.50**

SEE THESE BOOKS 10 DAYS FREE

McGRAW-HILL BOOK CO., Inc. FAC-11
327 W. 41st St., New York 36, N. Y.
Send me book(s) checked below for 10 days' examination on approval. In 10 days I will remit for book(s) I keep plus few cents for delivery costs, and return unwanted book(s) postpaid. (We pay delivery costs if you remit with this coupon—same return privilege.)

☐ Quick et al.—**WORK-FACTOR Time Stds., $9.00**
☐ Haines—**Auto. Control of Heating & Air Cond., $10.50**
☐ Kay & Palmer—**Chall. of Supervision, $6.95**
☐ Zetler & Crouch—**Succ. Comm. in Science & Ind., $7.95**
☐ Amic—**Fluorescent Lighting Manual, $12.50**

Name .....
Address .....
City ..... Zone .... State .....
Company .....
Position .....
For price and terms outside U.S. write McGraw-Hill Int'l., N.Y.C. FAC-11



"MORE USE PER DOLLAR"

Poly-V Belt is a single unit with even, uniform pull. Uninterrupted strength member gives much higher hp capacity per inch of drive width. No belt drive delivers as much power in the same space as Poly-V!

Steel Mill Converts to R/M POLY-V BELT on Rugged Hot-Saw Drive!

A 34½" wide R/M Poly-V® Belt of 92 ribs now delivers "power plus" on this punishing hot-saw drive at one of the country's largest steel works. Converting to Poly-V eliminates the problems of a multiple V-belt drive . . . matching, stretching, overloading, whipping and snapping of individual V-belts.

The patented Raybestos-Manhattan Poly-V Drive is a single unit, V-ribbed belt design that mates perfectly with Poly-V sheave grooves, eliminates V-belt stretch and length matching problems . . . reduces costly machine downtime and production slowdowns for individual belt replacement. Sheave ratio and belt position remain constant from *no* load to *full* load . . . assure smooth, *complete* power delivery under the toughest drive conditions. Poly-V Belt can't sink in the grooves under surges of load. This means less wear on belts and sheaves . . . and much more power in the same space as a multiple belt drive—or equal power in much less space!

Just two Poly-V Belt cross-sections meet every heavy duty drive requirement. Let an R/M representative show you how Poly-V Drive can give you greater power-packed performance and drive dependability . . . "More Use per Dollar" than the drive you now use. Write for Bulletin M141.

RM1020

When You Change Drives . . . Convert to R/M Poly-V Drive and Be Sure!

RAYBESTOS-MANHATTAN, INC.

MANHATTAN RUBBER DIVISION, PASSAIC, NEW JERSEY

RM

ENGINEERED RUBBER PRODUCTS . . . MORE USE PER DOLLAR

For more facts Circle 635 on Reader Service Card

FACTORY's exclusive series of ENGINEERING AND TECHNOLOGY REPORTS

are filled with up-to-date technical information. They provide background knowledge for smarter decisions.

They can help you . . .

- **Solve operating problems in your plant**
- **Plan plant modernization and expansion**
- **Train supervisors in technological improvements**

Reprints are still available

Start your library of Engineering and Technology Reports now. Select the titles you want from the list below.

No. 219....Synthetic Adhesives .....50¢
No. 221....Spot Heating .....35¢
No. 225....Warehousing Today .....50¢
No. 227....Production Counting .....35¢
No. 231....Scrap Recovery .....35¢
No. 234....Production Painting .....35¢
No. 239....Noise Control .....35¢
No. 242....Compressed Air Systems .....35¢
No. 248....Maintenance Painting .....35¢
No. 252....Non-Destructive Testing .....35¢
No. 258....Pumps—Maintenance and Selection .....35¢
No. 268....Lubrication .....35¢
No. 273....Steel Shelving .....35¢

Single copy prices are shown in the list above. Extra copies are priced as follows:

Single copy prices	**35¢**	**50¢**
2 to 24 copies, each	**25¢**	**40¢**
25 to 99 copies, each	**20¢**	**35¢**

Special offer. Set of any 4 reprints. $1.00

Send your order to Reader Service Department, FACTORY, 330 West 42nd St., New York 36, N.Y. Send check or money order, or a request for billing.

For a complete list of nearly 150 FACTORY reprints circle number 999 on the Reader Service Card, page 327.

Is your staff in need of additional experienced managerial talent?

• executives • works managers• factory superintendents • production managers • plant engineers • maintenance superintendents • mechanical and electrical engineers.

These men make it their business to read FACTORY. It keeps them well informed of important developments in all fields of manufacturing; trends in equipment, materials, technology and management techniques.

Where your recruitment progam calls for men of this calibre, there is no more efficient method of reaching them than through the pages of the publication they pay to read.

FACTORY
Employment Opportunities Section
Classified Advertising Division
P.O. Box 12 New York 36, N. Y.

LEGAL NOTICE

STATEMENT REQUIRED BY THE ACT OF AUGUST 24, 1912, AS AMENDED BY THE ACTS OF MARCH 3, 1933, JULY 2, 1946 AND JUNE 11, 1960 (74 STAT 208) SHOWING THE OWNERSHIP, MANAGEMENT, AND CIRCULATION OF

FACTORY published Monthly at Albany, New York, for October 1, 1961.

1. The names and addresses of the publisher, editor, managing editor, and business managers, are: Published by McGraw-Hill Publishing Company, Inc., 330 West 42nd Street, New York 36, N. Y.; Editor, Lester R. Bittel, 330 West 42nd Street, New York 36, N. Y.; Managing Editor, Robert S. Rice, 330 West 42nd Street, New York 36, N. Y.; Business Manager, William J. Thierer, 330 West 42nd Street, New York 36, N. Y.

2. The owner is McGraw-Hill Publishing Company, Inc., 330 West 42nd St., New York 36, N. Y. Stockholders holding 1% or more of stock are: Donald C. McGraw, Elizabeth McGraw Webster, Donald C. McGraw, Jr. & Harold W. McGraw, Jr., Trustees under Indenture of Trust m/b James H. McGraw, dated 1/14/21 as modified; Donald C. McGraw & Harold W. McGraw, Trustees under an Indenture of Trust m/b James H. McGraw, dated 7/1/37 as amended; Donald C. McGraw, Individually; Estate of Mildred W. McGraw, Donald C. McGraw and Catherine McGraw Rock, Executors; (all of 330 West 42nd Street, New York 36, N.Y.); Grace W. Mehren, 536 Arenas St., LaJolla, California; Douglass & Co., 140 Broadway, New York, N.Y., Touchstone & Co., c/o Wellington Fund, Inc., Claymont, Delaware.

3. The known bondholders, mortgagees, and other security holders owning or holding 1 percent or more of total amount of bonds, mortgages, or other securities are: None.

4. Paragraphs 2 and 3 include, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting; also the statements in the two paragraphs show the affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner.

5. The average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the 12 months preceding the date shown above was: 71,755.

McGRAW-HILL PUBLISHING COMPANY, INC.
By JOHN J. COOKE, Vice President & Secretary

Sworn to and subscribed before me this 18th day of September, 1961.
[SEAL] JANET A. HARTWICK
(My commission expires March 30, 1963)

TRANSACTER

A KEY MANAGEMENT TOOL IN ANY ATTACK ON "DIRECT OR INDIRECT COSTS"

TRANSACTER* — the first *proved in use*, system for automating shop paper work — is now employed by major industries to bring vital information — *as it occurs* — to Central Data Processing. Among these industrial leaders are:

Boeing Company

Garrett Corporation
AiResearch Manufacturing Division

General Electric Company

Hughes Aircraft Company

Laboratory for Electronics, Inc.

Librascope Division
General Precision Inc.

Nortronics a Division of
Northrup Corporation

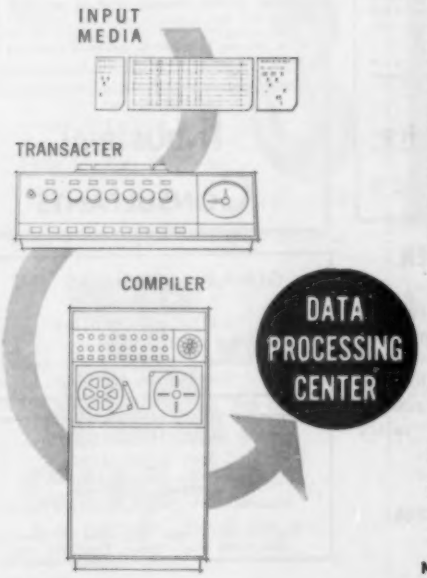
Sanborn Company

and a number of other major companies.

With the TRANSACTER System, continuous reporting of data such as:

- Production order status
- Direct and indirect labor distribution
- Inventory control — Receiving
- Machine utilization and tool crib withdrawals
- Engineering Project control
- Attendance recording and manpower effectiveness

These are but a few of the practical applications for the TRANSACTER System.



All data is pre-programmed — with provision for variables — for use on the factory floor — reducing to a minimum the incidence of human error — in creating records for manufacturing control.

For complete control of "Direct and Indirect Hidden Costs", the TRANSACTER System offers Management a heretofore unavailable means of opening new avenues for profit appreciation.

For more detailed information, write for new brochure, "The Missing Link in your Chain of Command".

GENERAL TIME CORPORATION
STROMBERG DIVISION • THOMASTON 5, CONN.
*TRADE MARK OF G T C.

MAKERS OF THE WORLD'S FINEST TIME EQUIPMENT

For more facts Circle 636 on Reader Service Card

EMPLOYMENT OPPORTUNITIES

NATIONAL COVERAGE

DISPLAYED

The advertising rate is $37.40 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.

An advertising inch is measured ⅞" vertically on a column—3 columns, 30 inches to a page.

Subject to Agency Commission.

—RATES—

UNDISPLAYED

$2.40 per line, minimum 3 lines. To figure payment count 5 average words as a line. Box Numbers—counts as 1 line.

Position Wanted ads, ½ of above rate.

Discount of 10% if full payment is made in advance for 4 consecutive insertions.

Not subject to Agency Commission.

TOOL ENGINEERS
ELECTRIC TYPEWRITER DIVISION

Continuing diversification of the Division's product line has created several attractive positions for tool engineers. These involve tooling for medium volume, high-precision mechanical and electromechanical parts and subassemblies. Extreme product reliability is of prime importance.

You should be able to demonstrate experience in the full support of the total manufacturing operation.

A history of contributions towards manufacturing breakthroughs is highly desirable.

You will be working for a progressive company actively encouraging creativity. Excellent facilities are fully supplemented with a liberal employee benefit program. All qualified applicants will receive consideration for employment without regard to race, creed, color or national origin.

Please write, outlining your background and experience, to:

Mr. A. J. Ronvaux, Department 563L

IBM

Engineering Laboratory
IBM Electric Typewriter Division
Lexington, Kentucky

INTERNATIONAL BUSINESS MACHINES CORPORATION

FOREIGN EMPLOYMENT

SMELTER
GENERAL SHIFT FOREMAN

B. S. Degree in Metallurgical Engineering or related field.

Fluent knowledge of English and working knowledge of Spanish.

Requires 4 years of smelting experience including operation of roasters, reverberatory furnaces and converters. Operating supervisory, metallurgical engineering or maintenance experience acceptable. Qualifications for advancement in the organization essential.

Excellent opportunity large Copper Company—Central Chilean area. Employment on contract basis in multiples of two years. Home leave vacation of two months at the end of two-year contract.

Transportation both ways and salary while traveling paid by Company. Provision also made to transport household effects.

In reply give complete details and references.

P7472 FACTORY

Class. Adv. Div. P.O. Box 12, N.Y. 36, N.Y.

SENIOR QUALITY CONTROL ENGINEER

Will analyze, evaluate, and verify package quality using statistical techniques in Production Quality Control Department of expanding midwestern pharmaceutical company.

Requires degree in Industrial Engineering or Mathematics plus four years' industrial engineering and/or quality control experience.

Replies confidential.

Please send resume to Manager, Technical Employment, Mead Johnson & Company, Evansville, Indiana.

All qualified applicants will receive consideration for employment without regard to race, creed, color, or national origin.

MAINTENANCE ENGINEER

Pennsalt Chemicals Corporation has opening for experienced Maintenance Engineer. Must be graduate engineer, either mechanical or chemical with at least 5 years chemical plant maintenance experience. Please submit resume of education, experience, and salary expected.

Pennsalt Chemicals®
ESTABLISHED 1850

Personnel Administrator
PENNSALT CHEMICALS CORP.
Wyandotte, Michigan

INDUSTRIAL ENGINEERS

We are seeking graduate Industrial Engineers with a maximum of three years' industrial experience.

Opportunities available in broad industrial engineering function which includes plant layout, job evaluation, methods improvement, work measurement, economic studies, capacity studies, package engineering, studies of specialized management problems, etc.

Assignment: Lancaster, Pa.

Write to:

R E. DAGLE

Armstrong
CORK COMPANY
LANCASTER, PA.

ADDRESS BOX NO. REPLIES TO: Box No. Classified Adv. Div. of this publication. Send to office nearest you.
NEW YORK 36: P. O. Box 12
CHICAGO 11: 645 N. Michigan Ave.
SAN FRANCISCO 11: 255 California St.

POSITION VACANT

Mechanical Engineer for Plant Engineer position with primary responsibilities in maintenance of process equipment and plant facilities. Prefer man with several years' plant experience. Growth potential, secure position with leader in its field. Reply by mail to WH Clark, The Milwaukee Journal, Milwaukee, Wis.

EMPLOYMENT SERVICES

Salaried Personnel—$6,000-$30,000. This nationwide service successful since 1927 finds openings in your field. Sells your abilities; arranges contacts. Present position protected. Write for details. Address: Jira Thayer Jennings, Dept. F. P.O. Box 674, Manchester, Vermont.

Hundreds of $7,000-$35,000 Executive jobs available. Write for free report. Strict confidence. National Employment Reports, 105 W. Adams, 830-X, Chicago 3.

POSITION WANTED

Plant Engineer—BSIE—4½ years plant engineering and plant expansion experience. PW-7724, Factory.

SPECIAL SERVICE

Time Study Boards with transparent watch holders, stop watches, Pedometers, Slide Rules. Forms in stock. Sample Kit Free. Oznam Products Co., 5544 S. Homan Ave., Chicago 29.

WANTED

Anything within reason that is wanted in the field served by Factory can be quickly located through bringing it to the attention of thousands of men whose interest is assured because this is the business paper they read.

INDUSTRIAL CONSULTANTS

GEMAR ASSOCIATES, INC.
CONSULTING
MATERIALS HANDLING ENGINEERS
74 Greenwich Ave., Greenwich, Conn.
Over 30 Years Experience

E. RALPH SIMS, JR.
AND ASSOCIATES
Consulting Industrial Engineers
Management Consultants
Planning, Design, Management, and Control of Mfg. and Distribution Operations and Facilities
436 North Maple Street, Lancaster, Ohio

Tayco Hooks

Taylor's Tougher

Safety Superintendents and Material Handling Engineers are getting longer, safer, more maintenance-free service from TM Alloy Sling Chains. Taylor's patented Tayco Hooks are an important reason. Channel-type construction not only protects the hooker's fingers, it also adds extra strength for tougher, safer service than conventional hooks. Get all the facts! Call your distributor or write for Bulletin 14-A.

Pat No. 2,646,306

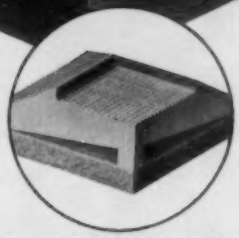
Chain is our specialty — not our sideline!

Taylor Made CHAIN SINCE 1873

S. G. TAYLOR CHAIN CO., Inc.
General Office: Hammond, Ind.
Plants: Hammond, Ind., and Pittsburgh, Pa.

Circle 637 on Reader Service Card

EXTEND EQUIPMENT LIFE CUT PLANT NOISE with SORBA-SOUND PEDESTALS



Used under feet of heavy machines to keep them quieter and steady—protects costly equipment.

- Rugged Hard Rubber
- Tough — Economical
- Special Air Chamber Absorbs Noise and Shock

TOP — 1⅜" x 2". BASE—4" x 4⅜".
#10 — Machines up to 500 lbs.—$1.10 ea.
#40 — Machines up to 1000 lbs.—$1.40 ea.
TOP — 3" x 2⅜". BASE—4½" x 5¼".
#60 — Machines up to 1000 lbs.—$1.50 ea.
#90 — Machines up to 3000 lbs.—$1.60 ea.

ORDER FROM

Evans **SPECIALTY COMPANY, INC.**

Dept. P, Box 8128, Richmond 23, Va.

For more facts Circle 638 on Reader Service Card

IT'S A SNAP

to keep life in FLEXOLINE lists without recopying

Snap out dead listings. Snap in new names in exactly the sequence you want. Type only fresh additions...in seconds...on scored sheets that separate into springy strips. Flexoline frames in hinged stands or rotaries hold thousands of strips for instantly visible reference. Perfect for listings of parts, phone information, cross files, account numbers, routing guides and hundreds of other active records. For more information, send the coupon now.

ACME VISIBLE

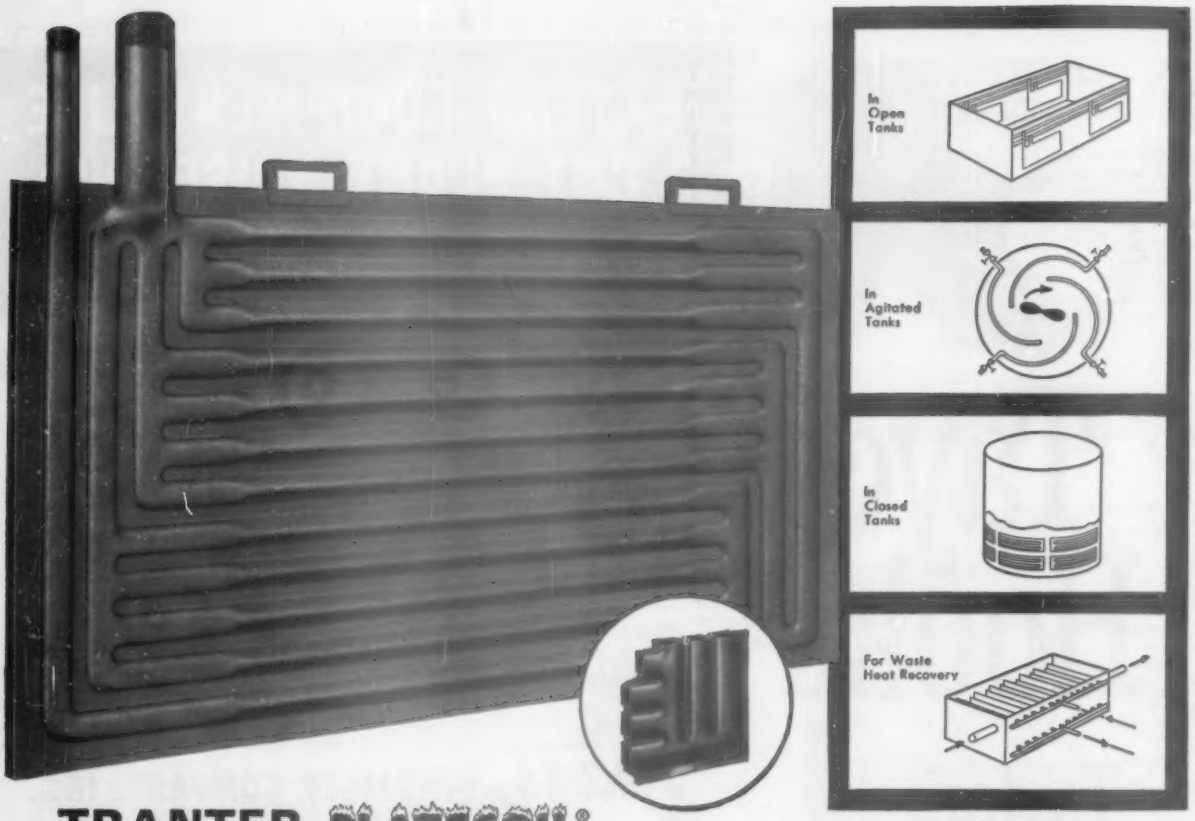
ACME VISIBLE RECORDS, INC.
3111 West Allview Drive, Crozet, Va.
Please give me full facts on time and money saving Flexoline reference systems.

NAME_____

ADDRESS_____

CITY_____ ZONE____ STATE_____

For more facts Circle 639 on Reader Service Card



TRANTER PLATECOIL®

Provides faster start-up, constant temperatures —cuts engineering, fabricating and maintenance costs in process heating and cooling.

The sketches above show just a few of the many uses for PLATECOIL. A wide variety of tank and process heating and cooling and general heat transfer problems have been solved with this equipment.

Exclusive MULTI-ZONE design cuts "down-time" and compensates for intermittent overload. Multiple headers and multiple condensate returns provide FREE-FLO action —with practically instantaneous distribution of steam to all levels of the plate. Condensate "trapping" is held to a minimum. This gives MULTI-ZONE PLATECOIL a reserve capacity to deliver under overload conditions during "start-up." It also produces extremely fast recovery of desired operating temperatures with minimum variations.

PLATECOIL is furnished as a factory fabricated unit. It eliminates the need for engineering and fabricating pipe coils. It is available in a wide range of sizes in both the MULTI-ZONE style for heating (shown above) or with serpentine pass arrangement for cooling. In addition to these "standard" styles, PLATECOIL can be engineered and built to exact application requirements. It can be made to order in curved and conical shapes, for example, for application to tank walls and bottoms.

Operating pressures up to 250 psig. Safety factor—5 to 1. Available in stainless steel, mild steel, Monel, Nickel, Inconel, Ni-O-Nel and Hastelloy® Alloys B, C and F and other weldable materials on special order.

PLATECOIL can be furnished to comply with ASME Code.

For complete data, write for Bulletin P-60.

Manufactured in Canada by Brodie Industries, Ltd. 44 Upjohn Rd., Don Mills, Ontario

Tranter Manufacturing, Inc.

LANSING 9, MICHIGAN

PLATECOIL® DIVISION

heat transfer specialists

Index To Advertisements

Acme Industries, Inc. 181
Acme Steel Company 168, 169
Acme Visible Records, Inc. 323
Aeroquip Corporation 259
Marman Division 195
Aerovent Fan Company 262
Albertson & Co., Inc. 56, 57
Allen-Bradley Company 175, 176
Allis-Chalmers 193, 194, 218, 219
Allis Co., Louis 186, 187
Aluminum Company of America 263
American District Telegraph Co. 292
American Gas Association 48, 49, 303
American Mutual Liability
Insurance Co. 152, 153
American Oil Company 217
Apex Machine & Tool Co. 172
Armco Drainage & Metal
Products, Inc. 165
Arno Adhesive Tapes, Inc. 200
Aro Equipment Corporation 197
Atlas Copco 279
Automatic, Division of Yale
& Towne Mfg. Co. .....23 - 27
Automatic Canteen Company 317

Bahnson Company 206
Barber-Colman Company 220, 221
Barreled Sunlight Paint Co. 223
Barnebey-Cheney 210
Barry Controls 274
Bassick Company 58
Bell & Gossett Company 213
Bellows-Valvair 237
Berkshire County Industrial
Development Commission 215
Bessemer and Lake Erie Railroad 248
Binks Manufacturing Company 277
Borroughs Manufacturing Co. 207
Bostitch 253
Boston Gear Works 298
Breuer Electric Mfg. Co. 311
Brown Company 307
Bussmann Mfg. Division,
McGraw-Edison Co. 62, 63

Calculagraph Company 234
Carrier Air Conditioning Co. 281
Champion Lamp Works 30, 31
Chart-Pak, Inc. 16
Chisholm-Moore Hoist Division,
Columbus-McKinnon Corporation 242
Clarage Fan Company 295
Clark, Cutler, McDermott Co. 252
Cleveland Tramrail Div., Cleveland
Crane & Engineering Co. 288
Colorado, Department of
Development 308
Comptometer Corporation 316
Conco Engineering Works 239
Conveyor Systems, Inc. 51
Crescent Tool Company 315
Crawford Door Company 302
Crown Controls Co., Inc. 264
Cutler-Hammer 202, 203

Day Company 266
Dayco Corporation, Rubber
Products Division 254, 255
DeSoto Chemical Coatings, Inc. 200
Detecto Scales, Inc. 310
DeVilbiss Company 44, 45
Diamond Chain Company, Inc. 199
Diagraph-Bradley Industries, Inc. 302
Dodge Manufacturing Corp. 160, 161
Dover Corp., Elevator Division 6
DuKane Corporation 282

East Chicago Machine Tool Corp. .. 9
Eastman Kodak Company 283
Ebco Manufacturing Company 261
Economy Engineering Co. 312
Electric Storage Battery Co. 247
Elliott Company 305
Equipment Manufacturing, Inc. 179
Eriez Manufacturing Co. .. 260, 262, 264
Esterbrook Pen Company 163
Evans Specialty Company, Inc. 323

Factory 320
Fafnir Bearing Company 267
Fairbanks Company 166, 276
Falk Corporation 171
Fastener Corporation 10
Felters Company 184, 185
Fenwal, Incorporated 291
Flintcote Company 200
Furnas Electric Company 196

Gardner-Denver Company 209
General Dynamics/Electronics 313
General Electric Company .. 50, 70, 289
Large Lamp Department 301
Wiring Device Department 174
General Plastics Corporation 304
General Time Corporation,
Stromberg Division 321
General Welding & Fabricating Co. .. 236
Glidden Company ..... 17 - 20
Globe Company, Products Division .. 258
Goodrich Industrial Products
Company, B. F. 1
Goodyear, Industrial Products
Div. 12, 13
Graphic Systems 316
Greene, Tweed & Co. 290
Gulf Oil Corporation 228, 229

Hancock Telecontrol Corp. 28, 29
Harnischfeger Corporation 245, 246
Heil Company 54
Hoover Ball & Bearing Company 37
Hough Company, Frank G. 201
Industrial Distributors, Ltd.
(Sales) 268, 269
Ingersoll-Rand 232, 233
IBM Corporation, Data Processing
Division 42, 43

Johnson Service Company 271

Kentucky, Department of
Economic Development 180
Kerrigan Iron Works Co. 294
Kidde & Co., Walter 190, 286
Kimberly-Clark 60, 61
Kirk & Blum Manufacturing Co. 188

Lewis Company, G. B. 206
Lewis-Shepard 272
Lion Oil Company 157
Lincoln Electric Company 154, 155
Link-Belt Company 52, 53
Louden Machinery Company 206
Lyon Metal Products, Inc. 39
Lunkenheimer Company .. Second Cover

Magline, Inc. 276
Magnetics, Inc. 243
Mahon Company, R. C. 191
Markem Machine Co. 224
Master Builders Company 249
Masury-Young Company 310
Mathews Conveyer Company, Ltd. .. 208
Maxon Premix Burner Company 303
McGraw-Hill Book Company 318
Metals & Controls Inc. 198
Methods Research Corp. 310
Micro Switch, a Division of
Honeywell 309
Minneapolis-Honeywell 314
Minnesota Mining & Manufacturing
Co. 227
Motorola Communications &
Electronics, Inc. 318
Multistamp Company 296

National Super Service Company 236
New York State Department
of Commerce 280
Northern Natural Gas Company 304

Otis Elevator Company 68, 69

Palmer-Shile 257
Pangborn Corporation 287
Pennsylvania Dept. of Commerce 8
Perfection Division, Hupp
Corporation 48, 49
Permacel 205
Philco, Government &
Industrial Group 225
Pinkerton's National Detective
Agency, Inc. 36
Pittsburgh Chemical Company 251
Pittsburgh Corning Corp. 230, 231
Plant Engineering & Maintenance
Show 7
Powell Pressed Steel Company 304
Prime Mover Company 294, 310
Prophet Company 260
Protectoseal Company 306
Puritan Chemical Company 162

Radio Corporation of America
Electronic Data Processing 55
Special Products Department 284
Ranco Industrial Products Co. 314
Rapids-Standard Co., Inc. 177
Raybestos-Manhattan, Inc. 319
Raymond Corporation 226
Republic Steel Corporation 32, 33
Revolvator Company 250
Richards-Wilcox Mfg. Co.,
Materials Handling Division 189
Ridge Tool Company 240, 241
Roebling's Sons Div., John A.,
Colorado Fuel & Iron Corp. 11
Rol-a-chart 316
Rollway Bearings Co. Inc. 212
Rome Cable Division of Alcoa 308
Rotor Tools Company 5
Roundtable Productions 274
Royal McBee Corporation 326

Sargent & Company 164
Shell Oil Company 21
Shepard Niles Crane & Hoist Corp. .. 183
Signode Steel Strapping Co. 64, 65
SKF Industries, Inc. 80
Snap-on Tools Corporation 192
Spencer Turbine Company 244
Square D Company .... 182, Third Cover
Standard Conveyor Company 300
Standard Pressed Steel Co.,
Columbus-Hallowell Div. 297
Standard Register Company 38
Stanley Works 275
Stic-Klip Manufacturing Co., Inc. 22
Structoglas, Inc. 71
Sugar Beet Products Company 170
Sun Oil Company 66, 67
Sylvania Lighting Products, Div. of
Sylvania Electric Products, Inc. 40, 41

Taylor Chain Co., S. G. 323
Taylor Co., Halsey W. 306
Tennant Company, G. H. 204
Texaco, Inc. 211
Thiokol Chemical Corporation 293
Timken Roller Bearing
Co. ..... Fourth Cover
Toledo Edison Company 284
Tomkins-Johnson Co. 46
Torit Manufacturing Co. 312
Torrington Company 285
Tranter Manufacturing Inc. 324
Triax Company 278

Union Steel Products Co. 235
Union Switch & Signal, Div. of
Westinghouse Airbrake Co. 47
Union Wire Rope, Armco Steel
Corp. 273
United Motor Service 74
U. S. Borax 79
U. S. Rubber Company
Mechanical Goods Division 72, 73
Footwear Division, Sealdbins 299

Van Dorn Iron Works 159
Vanguard 296
Veeder Root Incorporated 173

Wassell Organization, Inc. 178
Wear-Ever Aluminum, Inc. 302
Western Precipitation 308
Wiegand Company, Edwin L. 59
Wilson Rubber Company 265
Wing Manufacturing Co., L. J. 167
Worthington Corporation 238
Wright Hoist Div., American
Chain & Cable Co., Inc. 15

Yale & Towne Mfg. Co. 34, 35

■

Industrial Consultants 322

■

SEARCHLIGHT SECTION

(Classified Advertising)

F. J. Eberle, Business Mgr.

■

Employment Opportunities 322
Special Services 322
Notices, Legal 320

MATCHED!

MATCH YOUR INVENTORY TO INCOMING ORDERS . . . WITH A LOW-COST ROYAL McBEE SYSTEM TAILORED TO YOUR NEEDS.

Sharpen your focus of the entire operation with up-to-the minute inventory data. Are slow deliveries harnessing your sales department? Are you "bottlenecked" at seasonal peaks? Overstocked during "slumps"? Do you know exactly what was requisitioned? Received? Stored? Allocated? Used up? Have these answers at your fingertips with low-cost Royal McBee systems. Control any item—no matter how it moves or how long it takes to replenish. And the system is simple. Less writing, fewer forms, increased accuracy. With Royal McBee systems, stock-on-hand should seldom exceed — or fall short of — delivery requirements. They're "matched."

Adaptable to the needs of any size plant. For over 50 years, our representatives have been solving inventory and other business problems with flexible Royal McBee equipment. Your nearby Royal McBee man will be glad to discuss a low-cost system tailored to your needs. Call him or write for information to: Royal McBee Corporation at 850 Third Avenue, New York 22, N.Y

ROYAL McBEE CORPORATION

ROYAL
SPECIALISTS IN BUSINESS MACHINES

Want more information?

The editors of FACTORY provide this Reader Service Card as just that . . . a means by which you, the reader, can be serviced further. By using the postcard attached below, which doesn't even require a stamp, you can obtain more information on items mentioned in this issue's EQUIPMENT NEWS . . . MATERIALS NEWS . . . and IDEAS OF THE MONTH. You can get the catalogs described in the CATALOG NEWS and ADVERTISERS' LITERATURE columns. You can ask manufacturers for more data on ADVERTISED ITEMS.

TO SUBSCRIBE
Use handy order card in center of magazine

Don't forget to write your name and address—First thing to do is fill in your name, title, and address information on the postcard opposite. Then circle key numbers corresponding to those on items in Catalog News, Equipment News, Materials News, Ideas of the Month, Advertisers' Literature; and on advertisements of products or services on which you want more facts. Then mail; no postage necessary.

To correct your FACTORY mailing address—Just put your name and *new address* on the lines provided on the postcard at right. Write clearly across the card: ADDRESS CHANGE. *Please add your old address.* Then drop in the mailbox. We'll make the change as quickly as possible, so you won't have to wait for your issue of FACTORY.

CATALOGS —	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56
57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	78	79	80	81	82	83	84	85	86	87
EQUIPMENT —	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106							
107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128					
129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150					
151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172					
173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194					
MATERIALS —	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213							
214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235					
IDEAS OF THE MONTH —	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252									
253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274					
ADVERTISERS' LITERATURE —	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290										
291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312					
313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334					
335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356					
337	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378					
ADVERTISEMENTS —	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421								
422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443					
444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465					
466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487					
488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509					
510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	531					
532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553					
554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575					
576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597					
598	599	600	601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619					
620	621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640	641					
642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660	661	662	663					
664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680	681	682	683	77	999					

NAME..... TITLE.....

Card Good Only Through February 1962

COMPANY..... November 1961-2

STREET..... CITY AND STATE.....

CATALOGS —	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56
57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	78	79	80	81	82	83	84	85	86	87
EQUIPMENT —	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106							
107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128					
129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150					
151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172					
173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194					
MATERIALS —	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213							
214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235					
IDEAS OF THE MONTH —	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252									
253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274					
ADVERTISERS' LITERATURE —	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290										
291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312					
313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334					
335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356					
357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378					
ADVERTISEMENTS —	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421								
422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443					
444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465					
466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487					
488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509					
510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	531					
532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553					
554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575					
576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597					
598	599	600	601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619					
620	621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640	641					
642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660	661	662	663					
664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680	681	682	683	77	999					

NAME..... TITLE.....

Card Good Only Through February 1962

COMPANY..... November 1961-1

STREET..... CITY AND STATE.....

Reprints of most useful articles

These popular FACTORY articles are still available in useful reprint form:

No. 266	Manufacturing Organizations Today ..... A depth study of 31 companies	75¢	60¢	50¢
No. 270	The Unemployment Problem ..... Its causes, and what can be done about it	35¢	25¢	20¢
No. 273	Steel Shelving ..... Covers selection, layout design and costs	35¢	25¢	20¢

Prices per copy. First price, single copies; second price, 2-24 copies; third price, 25-99 copies.

Mail your order to Reader Service Department, FACTORY, 330 West 42nd St., New York 36, N. Y. Send check, money order, or cash — or ask us to bill you.

Over 100 helpful articles are available. For a complete list, circle 999 on the Reader Service Card. (Fill in reverse side of card below.)

FIRST CLASS
PERMIT No. 22876
PHILADELPHIA, PA.

BUSINESS REPLY MAIL
No Postage Stamp Necessary If Mailed in the United States

POSTAGE WILL BE PAID BY
McGRAW-HILL PUBLISHING CO., INC.

FACTORY
c/o Computer Center
P. O. Box 7972
Philadelphia 1, Pa.

FIRST CLASS
PERMIT No. 22876
PHILADELPHIA, PA.

BUSINESS REPLY MAIL
No Postage Stamp Necessary If Mailed in the United States

POSTAGE WILL BE PAID BY
McGRAW-HILL PUBLISHING CO., INC.

FACTORY
c/o Computer Center
P. O. Box 7972
Philadelphia 1, Pa.

Catalogs in this issue

To help you, here is a list of catalogs described in this issue. To obtain, circle key numbers on either postcard.

PIPES, VALVES, AND FITTINGS
1—Packings
2—Rubber hose
3—Solenoid valves
4—Non-metallic pipe
5—Gate valves
6—Metal hose connectors
7—Ball valves
8—Boot seal valve
9—Diaphragm valves

MECHANICAL
10—Speed reducers
11—Tensioners and idlers
12—Oilers, controls
13—Rod ends, bearings
14—General-purpose cylinder

INSTRUMENTS AND CONTROLS
15—Leak detectors
16—Digital recording systems
17—High-speed computer
18—Pressure transmitters
19—By-pass rotameters
20—Meters, accessories
21—Shock, vibration control
22—Recorders
23—Multi-point gauges

MATERIAL HANDLING
24—Fork-lift trucks
25—Plywood pallets
26—Fork-lift trucks
27—Conveyor engineering
28—Storage equipment
29—Walkie trucks
30—Pallet handlers
31—Electric vibrators
32—Fork-lift truck
33—Electric hoists
34—Slings
35—Bulk handling
36—Slings
37—Hand chain hoists

PRODUCTION
38—Drilling, tapping units
39—Burners
40—End mills, sinking cutters
41—Pumps, accessory units
42—Speed changers
43—Retaining ring
44—Steel, carbide drills
45—Grinding stresses
46—Process control
47—Heavy-duty lathes
48—Lubricating devices
49—Protective equipment
50—Wet blasters

ELECTRICAL
51—Synchronous motors
52—Proximity limit switch
53—Emergency lighting
54—Cable support systems
55—Floor boxes
56—Rigid PVC conduit
57—Pump motors
58—D-C power supplies
59—Survey service
60—Silicon rectifiers
61—Wiring conduit
62—Power supply centers
63—Speed reducers
64—Semiconductors

BUILDING
65—Lightweight door
66—Siding and roofing
67—Recessed luminaires

MAINTENANCE
68—Fire equipment
69—Lubrication systems
70—Scaffolds
71—Air cleaners

AUXILIARY
72—Fans
73—Centrifugal pumps
74—Heating and cooling
75—Coal-fired boiler
76—Gas regulators
78—Gas heaters
79—Fans
80—Heater sections
81—Water heaters
82—Centrifugal pumps
83—Fume control
84—Compressors, engines

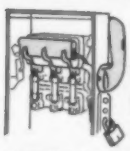
ONLY VISIBLE BLADES GIVE YOU SAFETY YOU CAN SEE!

• The men who pull the switches will tell you what can happen when a switch, *believed* to be open —*isn't*. A lot of things can happen—and every one of them is bad. Personnel safety is in jeopardy. Motors can single-phase. Machinery and work can be damaged. Down-time can skyrocket.

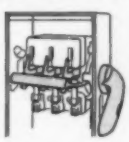
Doesn't it make sense to insist on **V**isible **B**lade construction which gives you a road block against any of those possibilities? Doesn't it make equally good sense to insist on the safety switch which gives you that construction—plus a lot of other performance advantages? Evidently it does, because *Square D switches have never been out of first place in more than 50 years!*

They cost no more...why settle for less?

Extra Safety with Square D's Handle Design



WHEN IT'S **UP** IT'S **ON!**



WHEN IT'S **DOWN** IT'S **OFF!**

Handle is integral part of switch, not cover. When door is opened, handle remains attached to switch. Eliminates hazard of false handle indication or defeat of padlock provision. When it's padlocked, it's locked!

Square D Company,
Mercer Road, Lexington, Kentucky

SQUARE D COMPANY

wherever electricity is distributed and controlled

For more facts circle 405 on READER SERVICE CARD

When you buy Timken® bearings you are investing in a better bearing value for today and in the future

TODAY'S automobiles, trucks, farm tractors and machines of all types are much more powerful and dependable, and they are heavier. Yet, the Timken® tapered roller bearings used in modern equipment are smaller and more economical than those used 10 or 25 years ago. That's possible because the Timken Company has found ways to pack more capacity into less space by improving bearing steels, design proportions, developing new ways to achieve precision geometry . . . and by investing in bearing life research.

The driving force behind these developments is the Timken Company philosophy of *Service.* Not just institutional service to industry, but the kind of individual, on-the-spot bearing service that Timken Company sales engineers are qualified to give. They are able and eager to give on-the-spot professional assistance to help you build serviceable, reliable, salable machines.

This dynamic partnership with industry has enabled the Timken Company to become the world's largest manufacturer of tapered roller bearings with the enviable reputation of product excellence, pioneering of new applications and bearing industry leadership. It explains in part why Timken bearings are preferred by so many engineers.

An important share of every Timken bearing sales dollar is plowed back into improving research, testing and production facilities. This impatience with just "good enough" is why practically every major tapered roller bearing development has come from The Timken Roller Bearing Company. Invest more of your bearing dollars with the leader—it will repay you in improved products and money-savings—now and in the future.

The Timken Roller Bearing Company • Canton 6, Ohio

For more facts circle 406 on READER SERVICE CARD